

**National Park Service
U.S. Department of the Interior**



Wind Cave National Park

South Dakota

Black-tailed Prairie Dog Management Plan

Draft Environmental Assessment

January 2006



EXECUTIVE SUMMARY

SUMMARY

The National Park Service is proposing to revise the Wind Cave National Park Prairie Dog Management Plan (NPS 1982) with management strategies that are consistent with the latest resource objectives and policies of the National Park Service. The primary purposes of revising the management plan for the black-tailed prairie dog (*Cynomys ludovicianus*) at Wind Cave National Park are: to propose and evaluate an approach for sustaining a long-term population of prairie dogs that meets other park objectives; to conserve natural processes and conditions; to identify tools to manage the black-tailed prairie dog population in the park; to manage park resources in accordance with the park's general management plan, resource management plan, and NPS *Management Policies 2001*; and to protect public health, safety, and welfare.

Four alternatives are analyzed in this environmental assessment:

Alternative A, The No Action/Continue Current Management Alternative: Under this alternative, overall active management of prairie dog populations throughout the park would not occur. However, isolated areas would be managed. The park would continue to control prairie dogs in the developed areas. No specific prairie dog population target levels would be defined under current NPS regional director guidance.

Alternative B, High Acreage Target (3,000 to 5,000 acres): The park's prairie dog population would be encouraged to expand from current conditions of approximately 2,200 acres to total acreage between 3,000 to 5,000 acres. All management tools listed below would be available to achieve the target range of acres. An Active Management Zone, extending about one-quarter mile inside the perimeter of the park, would be established as a zone where prairie dogs would be controlled if conflict with adjacent landowners existed. A No Prairie Dog Zone, where prairie dogs would not be allowed to establish colonies, would include developed areas of the park.

Alternative C, Mid-Range Acreage Target (1,000 to 3,000 acres) – the Preferred Alternative: The park's prairie dog population would be managed to maintain colony acreages within the 1,000 to 3,000 acre range. All management tools listed below would be available to achieve the target colony acreages. A No Prairie Dog Zone, where prairie dogs would not be allowed to establish colonies, would include developed areas of the park. Prairie dog control measures would be considered on a case-by-case basis in consultation with neighboring private landowners.

Alternative D, Low Acreage Target (300 to 1,000 acres): The park's prairie dog population would be managed in order to reduce acreage from the current estimate of 2,200 acres to a range between 300 to 1,000 acres. All management tools listed below would be available to achieve the target colony acreages. A No Prairie Dog Zone, where prairie dogs would not be allowed to establish colonies, would include developed areas of the park.

Desired Future Condition under the Action Alternatives

The prairie dog management plan would manage the black-tailed prairie dog population so that it can persist over time and fulfill its ecological role while meeting management objectives for other resources, particularly species that depend on prairie dogs and their habitat, ungulate grazers, and vegetation. The desired condition would include a prairie dog population that can withstand, or at

least recover from, stochastic events such as prolonged drought or a disease outbreak such as sylvatic plague.

Management Tools

The available management tools would be the same for all of the action alternatives. These include lethal control tools (rodenticide, shooting by park staff), non-lethal control tools (live trap and relocate), and habitat management tools (management of other species' grazing levels, mowing and mechanical thinning, natural barriers, physical barriers, landowner incentives funded by non-NPS entities, and conservation easements). The implementation of tools would be evaluated on a case-by-case basis to determine what would be best to achieve the objective of control while having the fewest adverse effects on resources.

The alternatives analyzed in this environmental assessment would not result in impairment of park resources or values.

PUBLIC COMMENT

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. This environmental assessment will be on public review for 45 days. Comments may also be submitted via the website, <http://parkplanning.nps.gov/wica>. Please note that the names and addresses of people who comment become part of the public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. Anonymous comments may not be considered. We will make all submissions from organizations, from businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Comments must be received by March 10, 2006. Please address written comments to:

Superintendent
Wind Cave National Park
26611 U.S. Highway 385
Hot Springs, SD 57747-9430

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PURPOSE AND NEED

INTRODUCTION

The existing Wind Cave National Park Prairie Dog Management Plan (NPS 1982) and Wind Cave National Park Final General Management Plan (NPS 1994a) (GMP) call for a black-tailed prairie dog (*Cynomys ludovicianus*) population to occupy 700 acres of prairie habitat in the park. This number was derived through interpretation of aerial photographs taken in the late 1930s and by looking at the acres of active prairie dog colonies. These photographs were taken following extensive prairie dog control efforts conducted in the 1920s and 1930s. The 1982 Prairie Dog Management Plan and the GMP adopted this active prairie dog acreage of 700 as their management target.

Currently, the prairie dog colony acreage in the park is approximately 2,200 acres, based on 2004 and 2005 mapping and estimated expansion of unmapped colonies. The 1982 management plan and GMP established the target acreage at 700, to be continued with a program of regular lethal control of the prairie dog population. As such, the use of lethal control and the establishment of the 700-acre prairie dog population target were not based on science (Fischer 1982) and conflicted with National Park Service policies (NPS 2000a; NPS 2004a). When the black-tailed prairie dog was determined to warrant listing under the Endangered Species Act in 1999, NPS policies regarding candidate species was interpreted to limit regular control efforts. Research and studies conducted in the prairie ecosystem have provided a better understanding of the prairie dog's key role in the ecosystem. As stated in the existing 1982 Prairie Dog Management Plan (NPS 1982), "information obtained from new and ongoing studies will be used for future modifications and improvements of the management program." As a result, this management plan and environmental assessment will present revised management strategies that are consistent with the latest resource objectives and policies of the National Park Service and to manage the species so that it can maintain its ecological role in the mixed grass prairie of Wind Cave National Park.

This document will present the proposed actions and alternatives associated with a revised prairie dog management plan that will be analyzed for their potential effects on the natural, cultural, and socioeconomic environments in and around Wind Cave National Park.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Purpose of the Proposed Action

The primary purposes of developing a management plan for the black-tailed prairie dog at Wind Cave National Park are to propose and evaluate an approach for sustaining a long-term population of prairie dogs that meets other park objectives; to conserve natural processes and conditions; to identify tools to manage the black-tailed prairie dog population in the park; to manage park resources in accordance with the park's general management plan (NPS 1994a), resource management plan (NPS 1994b), and NPS *Management Policies 2001* (NPS 2000a); and

to protect public health, safety, and welfare. The resulting plan would be used to manage prairie dogs in the park until the plan is obsolete or no longer feasible.

The following objectives are more specific statements of purpose that were identified by NPS staff in initial project planning phases. Successful management of the prairie dog resource will depend on the degree that these objectives are realized.

- Establish and maintain a black-tailed prairie dog population within the park that achieves a sustained minimum population size and distribution that is sufficient to fulfill the ecological keystone role of the species.
- Define and map all prairie dog complexes associated with Wind Cave National Park.
- Establish the appropriate target prairie dog population levels that are ecologically sound and allow other park objectives to be achieved.
- Conserve regional biological diversity, especially rare and imperiled species.
- Establish management zones for prairie dogs within the park based upon existing colonies, neighboring land uses, and suitable habitat, while maintaining native plant communities and plant diversity.
- Protect ethnographic and other cultural resources associated with prairie dog colonies.
- Continue monitoring prairie dog populations to ensure that prairie dog management actions are maintaining long-term viable populations and that management objectives are being met.
- Identify potential methods that can be used to control prairie dog populations if control is needed.
- Develop a contingency plan for disease outbreaks in prairie dog populations.
- Implement actions that recognize the public / neighbor interface (the boundary area) and the need to foster a “good neighbor” policy.

Need for the Proposed Action

An updated prairie dog management plan is needed at Wind Cave National Park to ensure that the local prairie dog population remains viable, which would maintain its key role in the ecology of the park. The black-tailed prairie dog has become more of a conservation concern over the last 20 years because of dwindling populations and large complexes, lack of regulatory protection, plague, and habitat loss. The new plan would address the NPS Midwest Region Prairie Dog Management Policy Statement (NPS 2004a) that states “parks should allow for natural prairie dog abundances, distribution, and conditions wherever possible” and that the removal or lethal control of prairie dogs or other species would only be allowable under circumstances that would not have unacceptable adverse impacts on the prairie dog population as a whole or to other components or processes of the prairie dog ecosystem. Also, the black-tailed prairie dog was

removed from the candidate list by the U.S. Fish and Wildlife Service in August 2004, which changed perceptions of how the National Park Service could manage this species.

Wind Cave National Park does not have an updated prairie dog management plan that is consistent with the park's current resource conditions and recent changes to regulatory guidance concerning the black-tailed prairie dog. The prairie dog population occupies approximately 2,200 acres, while the 1982 Prairie Dog Management Plan and the park's general management plan call for a maximum of 700 acres. A revised long-term management plan is needed to resolve this conflict and provide the park with management tools to maintain the prairie dog population as one of the park's primary prairie resources. The prairie dog functions as a keystone species because a number of wildlife species depend on prairie dogs and/or the unique habitat they create (Miller et al. 2000, NRCS 2001). Keystone species have an ecological effect disproportionate to their abundance; a decline in a keystone species' population initiates changes in ecosystem structure and a decline in overall species diversity (USFWS 2000).

The existing 1982 Prairie Dog Management Plan calls for regular, repeated use of rodenticide to maintain the prairie dog colony acreage at 700 acres. However, this was established with little consideration of the prairie dog's role as a keystone species in the ecology of the park. The current plan conflicts with current NPS guidance and policy because of its lack of scientific foundation and NEPA compliance was not completed for the 1982 plan. As a result, the management of this resource needs to be revised to be consistent with policy and guidance.

There is potential for prairie dogs to pose a hazard to public health, safety, or welfare. Prairie dogs in other western and southwestern states have long been known to be potential reservoirs for sylvatic plague. The disease has recently been reported in prairie dogs in South Dakota. Fleas that use prairie dogs as hosts are known to carry the plague bacteria, *Yersinia pestis* (NBII 2005). Awareness of the potential for prairie dogs to act as a vector for the disease is needed, thus public health, safety, and welfare issues need to be included in this prairie dog management plan.

Wind Cave National Park began to explore the possibilities of reintroducing the black-footed ferret in 2002. However, it was readily apparent that an updated black-tailed prairie dog management plan was a prerequisite to a reintroduction, thus an additional need for the preparation of this plan.

There is also concern that the burrowing activities of prairie dogs can compromise infrastructure or facility integrity (e.g., roadbanks or foundations), which could pose hazards to public health, safety, and welfare. As a result, management is needed to ensure that prairie dog activities do not create potential unsafe or hazardous conditions that could affect the public.

In the event the presence of prairie dogs persistently conflicts with other park natural resource objectives, human uses or activities in the park, or prairie dogs disperse from the park to adjacent private lands where they are unwanted, and there is no way to accommodate the presence of prairie dogs, there may be a need to use lethal controls. This prairie dog management plan evaluates the conditions where and when lethal controls may be used.

The threshold for management action will be the upper or lower limit of the chosen alternative. In situations requiring reduction, control efforts will be taken first on areas of the park border

where conflicts with adjacent landowners are taking place. If continued reduction is required, additional actions will be taken on interior portions of the park. In situations requiring prairie dog reduction where the upper limit has not been reached, a documented dispersal of prairie dogs from park to adjacent lands, along with adverse effects to grazing or agricultural resources will be the threshold for action. Lethal control actions involving the use of rodenticides would only be used in fall and winter months.

PURPOSE AND SIGNIFICANCE OF THE PARK

Description of the Park

Wind Cave National Park is located in western South Dakota, on the southeast edge of the Black Hills. The park was established in 1903 to protect Wind Cave (NPS 1994a). Wind Cave National Park encompasses 28,295 acres of prairie ecosystem, underlain by extensive karst deposits, with Wind Cave being one of the world's longest caves. The cave is well known for its outstanding display of boxwork, an unusual cave feature composed of thin blades of calcite that resemble honeycombs (NPS 2001a). In addition, the park has over 40 other, smaller caves (NPS 2001a).

Since the original designation, the purpose of the park has been expanded from cave preservation alone to protect both surface and subsurface resources. The visitor center receives about 110,000 visitors annually, with 80,000 to 95,000 entering the cave by ranger-led tours.

The surface features of the park include expanses of mixed-grass prairie, ponderosa pine and riparian ecosystems. The gently rolling landscape of the park is a transition zone between eastern and western biomes, and supports a great diversity of plant and animal species (NPS 1994a). The park is well known for its resident bison (*Bison bison*) herd, as well as its opportunities to view mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), elk (*Cervus elaphus*), prairie dogs, wild turkey (*Meleagris gallopavo*), raptors and a variety of small mammals (see Figure 1).

The cultural resources of Wind Cave National Park include evidence of prehistoric and Plains Indian cultures, records of early cave exploration and tourism, and Civilian Conservation Corps structures. The National Register of Historic Places includes the Wind Cave National Park Administrative and Utility Area Historic District along with several related historic properties. Other National Register-eligible properties are scattered throughout the park.

Recently, Highway 87 within Wind Cave National Park has been suggested to be eligible for the National Register as a cultural landscape. No National Register-eligible traditional cultural properties have been formally defined for Wind Cave National Park.

The park boundary is approximately 6 miles north of Hot Springs, South Dakota, and is bounded by Custer State Park on the north, Black Hills National Forest on the west, and by private property on the south and east. The park is one of a variety of destinations for Black Hills visitors. Attractions in the immediate area include Mount Rushmore National Memorial, Jewel Cave National Monument, Crazy Horse Memorial, the Mammoth Site of Hot Springs, and Badlands National Park (Figure 2).



FIGURE 1. PARK VISTA WITH BISON

Significance and Legislation

Wind Cave National Park was established in January 1903 (32 Statute 765) as a 10,532-acre park to protect Wind Cave and the underground resources of this unique site. It was the eighth national park and the first created to protect a cave. The original legislation applied only to the cave and surface developments needed for the management and care of the cave (NPS 1994a). The parklands at that time were small and there were no bison, elk, or pronghorn. These big game species were introduced later.

The purpose of Wind Cave National Park has evolved from cave preservation to protection of both subsurface and surface ecosystems. In 1912, establishment of the Wind Cave National Game Preserve provided a permanent range for bison and “such other native American game animals as may be placed therein.” Herds of bison and elk were re-established as the need to preserve and protect big game species was realized. In 1935, management of the game preserve was transferred from the Bureau of Biological Survey in the Department of Agriculture to Wind Cave National Park in the Department of Interior. Through a series of expansions, by 1946, the park encompassed over 28,000 acres to maintain a viable population of a variety of big game. Additional legislation in 1978 added approximately 228 acres to the southern end of the park (NPS 1994a).

Although the black-tailed prairie dog is not specifically identified by name as a resource to be protected in the establishing legislation or its expansions, the prairie dog is an integral element of the mixed-grass prairie habitats and surface ecosystems that the park is mandated to protect.

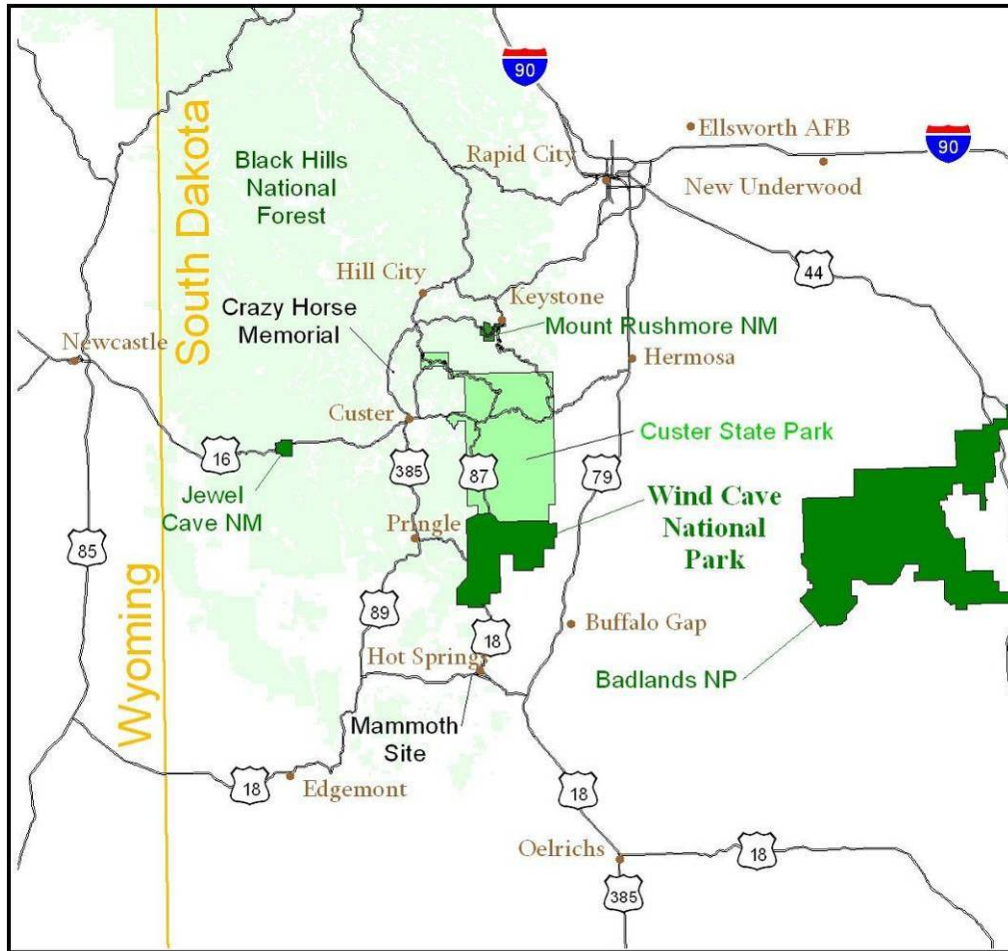


FIGURE 2. REGIONAL MAP OF WIND CAVE NATIONAL PARK

BLACK-TAILED PRAIRIE DOG RESOURCE BACKGROUND

The black-tailed prairie dog is strongly associated with the prairie ecosystem and has been present within Wind Cave National Park for thousands of years (Carlson 1986, White 1986). As of March 2004, active black-tailed prairie dog colonies in Wind Cave National Park occupied approximately 1,855 acres. In August 2005, it was estimated the park had approximately 2,200 acres of prairie dogs, or about 7.8 percent of the present park area (Figure 3). The park area occupied by black-tailed prairie dogs varies according to many environmental variables, but precipitation has a pronounced effect, causing prairie dogs to expand their colonies in dry times and to maintain or shrink colony size when precipitation is near the norm or during extended wet periods. Currently the park supports approximately 16 prairie dog colonies. The park's population is notable because it has no recorded instances of plague, thus making it a prime candidate location for potential black-footed ferret (*Mustela nigripes*) reintroduction (Barnes 1993).

Custer State Park is immediately north of the park and contains approximately 17,000 acres of prairie grasslands that support prairie dogs, bison, and other grassland species. Prairie dog

colonies in Custer State Park occupy about 300 to 500 acres. A few small prairie dog towns have also occurred on lands adjacent to Wind Cave National Park, although the majority were poisoned as of fall 2004 (Roddy pers. comm. 2005b).

The Black Hills National Forest abuts much of the western boundary of Wind Cave National Park, with the remainder of the neighboring properties under the control of the state or private landowners.

The black-tailed prairie dog, one of five species of prairie dogs found in North America, is native to the Great Plains in 11 states from Texas to Montana, one Canadian province, and two Mexican states. The U.S. Fish and Wildlife Service cited studies in its 2000 “warranted but precluded” candidate listing estimated the prairie dog currently occupies approximately one to six percent of its historical range (USFWS 2000, 65 *Federal Register* 5476). Animals such as the black-footed ferret and burrowing owl (*Athene cunicularia*) are endangered or declining in numbers primarily because fewer prairie dogs remain to create and maintain the unique patches of habitat required by these species. In its role as a keystone species, the black-tailed prairie dog has been identified as a pivotal ecosystem component strongly influencing populations of several rare or endangered species, including the black-footed ferret, burrowing owl, golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), and other obligate species such as the horned lark (*Eremophila alpestris*) (Kotliar *et al.* 1998). These species have been present in the park. Consideration of their population status is important in this prairie dog management plan.

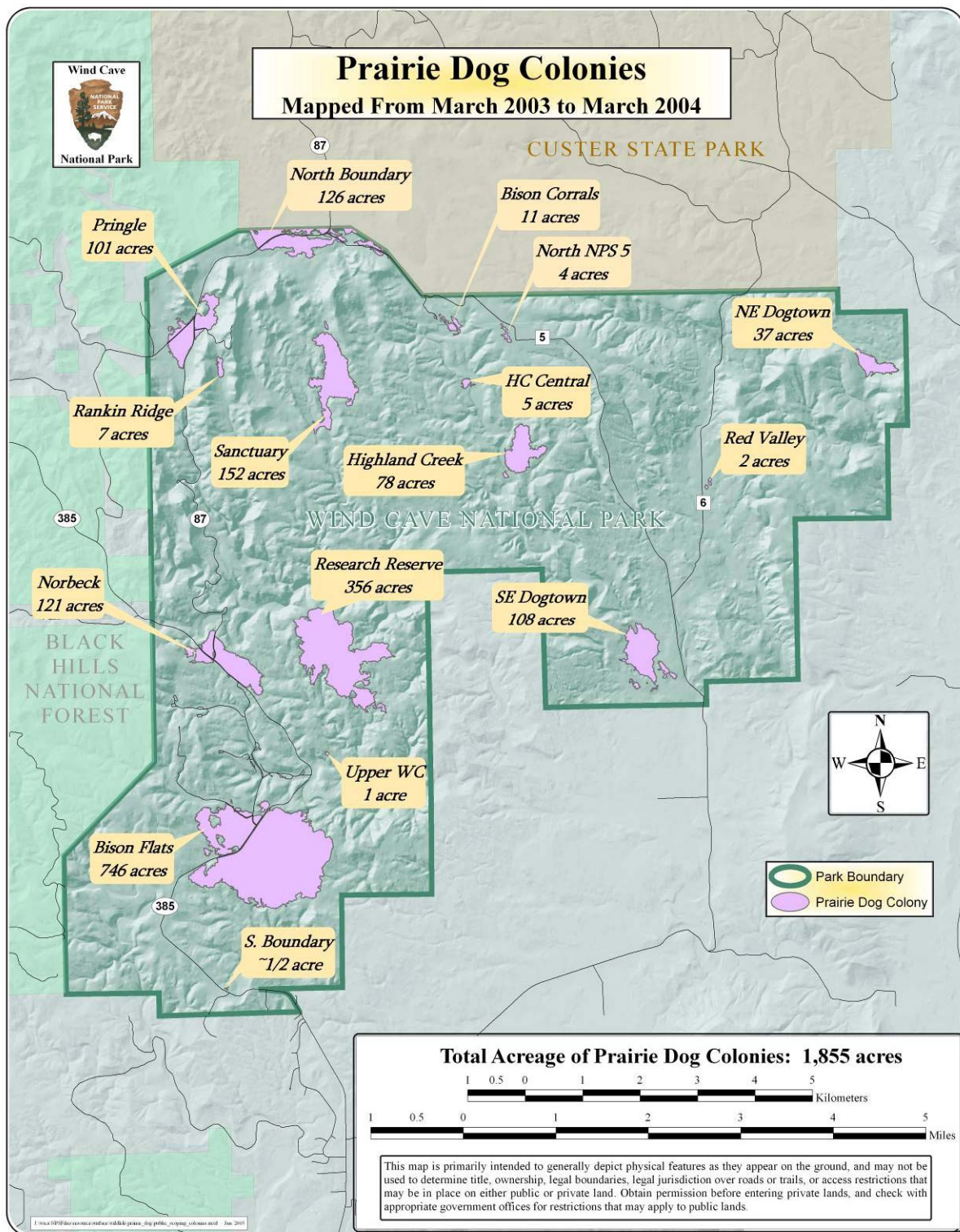
In mixed-grass prairie, bison and other ungulates have a symbiotic relationship with the black-tailed prairie dog. Ungulate grazing shortens vegetation, allowing prairie dog colonization, while prairie dog activities enhance the nutrient quality of some vegetation for the ungulates. Prairie dogs alter vegetation species richness, structure, phenology, and biomass compared to adjacent uncolonized mixed-grass prairie (Detling and Whicker 1988; Archer *et al.* 1987). Some researchers have concluded that prairie dogs act as ecosystem regulators by maintaining, creating, and regulating habitat biodiversity through soil and vegetation manipulation (Agnew *et al.* 1986).

Nationwide, habitat conversion and fragmentation, inadequate protection through regulatory mechanisms, sylvatic plague outbreaks, and control in the form of poisoning have all been identified as factors contributing to the decline of the species (USFWS 1999). Plague, an introduced exotic disease, has decimated prairie dog populations since the time it was first found to infect black-tailed prairie dogs in the mid-1940s (Barnes 1993). Currently plague is known from all parts of the historic range of black-tailed prairie dogs and has recently been detected in South Dakota.

Description of the Management Area

Population and habitat management focuses on black-tailed prairie dog colonies in the park. Figure 3 shows the location and extent of the colonies as of March 2004. The occupied area is predominantly a prairie ecosystem, dominated by blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyron smithii*), and little bluestem (*Schizachyrium scoparium*). This system also supports a variety of forbs and shrubs, including yucca (*Yucca glauca*), prairie clover (*Dalea aurea*), prickly pear (*Opuntia polycantha*), black-eyed Susan (*Rudbeckia hirta*), and cinquefoil

(*Potentilla hippiana*) (NPS 2001a). The dominant vegetation within the colonized areas is purple three-awn (*Aristida purpurea*). Other commonly found species include: large-bract vervain (*Verbena bracteata*), Canada thistle (*Cirsium arvense*), common horehound (*Marrubium vulgare*), dwarf conyza (*Conyza ramosissima*) and fetid marigold (*Dyssodia papposa*) (Cogan *et al.* 1999).



**FIGURE 3. PRAIRIE DOG COLONY DISTRIBUTION IN WIND CAVE NATIONAL PARK
MAPPING COMPLETED IN MARCH 2004 (UPDATED MAPPING EFFORT IN PROGRESS)**

Related Projects, Plans, and Policies

The action alternatives would not be inconsistent with any ongoing or planned management activities within the park. Specific plans and policies that relate to the actions proposed in this prairie dog management plan and environmental assessment are summarized below.

The 1982 Prairie Dog Management Plan prescribed the use of zinc phosphide lethal control in combination with the use of hormonal sterilants and maintenance of the elk and bison herd size to depress prairie dog reproduction to achieve and maintain a total colony acreage of 700 acres. There are no park records reflecting that the target of 700 acres was ever reached. The prairie dog management plan being proposed in this document would revise the acreage targets and identify management tools that could be used to reach these targets. The actions prescribed would be consistent with NPS policies regarding lethal control of animal populations and consider the effects on all related resources.

Revision of the prairie dog management plan represents a continued commitment to preserve valuable park resources. These resources include the black-tailed prairie dog itself and the numerous interdependent species that rely on the prairie dog and the habitat alterations that prairie dogs make. These species include burrowing owl, snakes, rodents, predators such as coyote (*Canis latrans*), raptors, and badger (*Taxidea taxus*), and extirpated species such as the black-footed ferret.

The 1994 **Wind Cave Resource Management Plan** and the 1994 **Final General Management Plan/Environmental Impact Statement** outline the direction for proposed actions to be taken in protecting park resources and enhancing visitor experiences at the park. The park's general management plan (NPS 1994a) states that the park should "continue to monitor prairie dog towns and take necessary steps to maintain the town's total acreage." This statement, taken in conjunction with the 1982 Prairie Dog Management Plan, indicates that the necessary steps would likely include population control measures, based on the assumption that the 700-acre target for prairie dog colonies was being exceeded by a substantial amount in 1994 (colony acreage was probably near 1,300 acres).

NPS Midwest Region Prairie Dog Management Policy Statement. October 14, 2004
Memorandum from Ernest Quintana, Regional Director, Midwest Region National Park Service to the superintendents at Badlands, Fort Larned, Scotts Bluff, Theodore Roosevelt, and Wind Cave NPS units. This policy statement reads "parks should allow for natural prairie dog abundances, distribution, and conditions wherever possible." In addition, parks with prairie dog conservation issues must complete a park prairie dog conservation plan that clearly articulates park goals for maintaining healthy prairie dog populations. The policy goes on to state that such a plan would "be subject to the National Environmental Policy Act and all other appropriate compliance and consultation requirements." The removal or lethal control of prairie dogs would be allowable under circumstances that would not have unacceptable impacts on the prairie dog population as a whole or to other components or processes of the prairie dog ecosystem.

South Dakota Prairie Dog Conservation and Management Plan. South Dakota Game, Fish, and Parks released the final draft of their prairie dog management plan in February 2005. This document provides guidance for the management of prairie dogs on state and private lands in the

state, with specific attention to landowners that are adjacent to federal lands. The goal of this plan is to “manage for long-term, self-sustaining prairie dog populations in South Dakota while avoiding negative impacts to landowners that do not wish to accommodate prairie dogs on their properties.” South Dakota Game, Fish, and Parks’ current policy is to provide prairie dog control assistance to private landowners adjacent to public lands in South Dakota on an annual basis if there is sufficient evidence that prairie dogs are encroaching from public lands.

Fall River County Prairie Dog Management Plan. The Fall River Conservation Board may prepare a management plan, although no details regarding the plan’s content or date of completion were available at this time. This plan would affect how neighboring landowners could potentially manage prairie dogs on their lands and although not binding on National Park Service lands, cooperative interaction would help to meet one of the park’s objectives regarding a “good neighbor” policy.

Wind Cave National Park Bison Management Plan / Environmental Assessment. This plan is currently in preparation and will establish the size of the bison population and provide input for the distribution of forage among grazers.

Wind Cave National Park Vegetation Management Plan / Environmental Assessment. This plan is currently in preparation. This will establish direction for the future management of native and non-native vegetation in the park. This could have effects on the amounts of available forage and any rehabilitated forage areas, as well as determine potential vegetation management activities conducted to encourage or inhibit prairie dog colonization.

Wind Cave National Park Black-footed Ferret Reintroduction Plan / Environmental Assessment. This plan is currently on hold, pending completion of the park’s black-tailed prairie dog management plan. The proposed action would reintroduce black-footed ferrets to Wind Cave National Park. The proposed action would contribute to the U.S. Fish and Wildlife Service goal of establishing a pre-breeding population of 1,500 ferrets in 10 or more distinct populations with no fewer than 30 breeding adults in any population (the Black-footed Ferret Recovery Plan is currently being revised). Ferrets in Wind Cave National Park would likely be classified as an experimental, non-essential population. Because prairie dogs would be the ferrets’ primary prey base within the park, their reintroduction would affect the prairie dog population in the park, and thus, the management actions determined in this prairie dog management plan.

Wind Cave National Park Elk Management Plan / Environmental Impact Statement. This plan is currently in preparation and will establish the desired population size of elk using the park, determine the most appropriate methods to reduce the elk population, and how to maintain the desired population size. This plan will provide input regarding the effects of the variable elk population on forage availability.

Wind Cave National Park Fire Management Plan / Environmental Assessment. The Fire Management Plan is a detailed program of action that provides specific guidance and procedures for using fire to restore and perpetuate natural processes in the park. This is done by accomplishing the park’s fire management objectives, such as: defining levels of protection necessary to ensure safety and protection of facilities and resources; and minimizing the undesirable environmental impacts of fire management. Prescribed fire can influence the size and location of prairie dog colonies.

Wind Cave National Park Boundary Revision / Environmental Assessment. Completed in June 2002, this plan and NEPA compliance document presents information and analysis for the addition of 5,675 acres on the southern boundary of Wind Cave National Park. The boundary revision was addressed by congressional action in 2005.

Wind Cave National Park Wastewater Treatment Facility Environmental Assessment. The park is planning to relocate the wastewater treatment lagoons to a location that allows a greater evaporation rate to fully remove inputs of wastewater and precipitation. Implementation of the project would protect the park's cave resources from exposure to organic pollutants. This plan is currently in the last stages of preparation.

Wind Cave National Park Project to Rehabilitate Highway 87 and Visitor Center Access Roads Environmental Assessment. This plan is currently in the last stages of preparation and proposes to rehabilitate and resurface 1.4 miles of the visitor center access road and 7.2 miles of South Dakota State Highway 87 within the boundaries of Wind Cave National Park. The overall goal of this project is to improve the structural integrity and safety of the main north-south access road within Wind Cave National Park. The travel surfaces of the park roads and bridges are aging and in poor condition. Several prairie dog colonies are adjacent to the highway corridor in which most of the rehabilitation and resurfacing work would take place. This could affect the prairie dog population and interrupt implementation of some management actions that may be determined by this prairie dog management plan.

Scoping

Scoping is the effort to involve agencies and the public in determining the issues to be addressed in the environmental evaluation. Among other tasks, scoping determines important issues; allocates assignments among the interdisciplinary team members and other participating agencies; identifies related projects and associated documents; identifies permits, surveys, or consultations required by other agencies; and creates a schedule which allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made.

An internal scoping meeting held at the park in December 2004 identified the main issues and impact topics to be addressed in this environmental assessment.

At a minimum, National Park Service agency scoping includes input from the State Historic Preservation Officer, the U.S. Fish and Wildlife Service, and Native American tribes affiliated with the park. During development of this environmental assessment, the park contacted the South Dakota State Historic Preservation Officer (SHPO), the U.S. Fish and Wildlife Service, and affiliated tribes by letter. Public workshops were also held prior to alternatives development. Public scoping meetings were held in Rapid City and Custer, South Dakota on February 1 and 2, 2005, respectively. A summary of the scoping activities undertaken prior to development of this environmental assessment can be found in the "Consultation and Coordination" section. Copies of consultation letters may be found in Appendix A.

The objectives previously listed in the "Purpose and Need" section were initially developed during internal scoping and refined based on public scoping input. Acreage targets for prairie dog colonies in the park, identified in the subsequent description of alternatives, were also

developed during internal and public scoping. The allocation of forage among the park's primary grazing species (*i.e.*, bison and elk) was done using a forage allocation model (discussed in detail in the "Wildlife" section) and is still in progress as management plans for bison, elk, and vegetation, in addition to this plan, are currently in preparation.

Representatives from the U. S. Forest Service; South Dakota Game, Fish, and Parks; and Custer State Park participated and attended internal and public scoping meetings. U.S. Fish and Wildlife Service and tribal representatives were invited but did not attend, nor did they contribute any specific issues during scoping. However, when the park notified the U.S. Fish and Wildlife Service of this project, they responded with an interest in having the park analyze future black-footed ferret reintroductions in the park. The South Dakota State Historic Preservation Officer was contacted regarding protection of cultural resources and that information is included in the discussion of cultural resources. The agency representatives that attended the scoping meetings contributed to the overall development of the issues identified below.

Issues

Issues and concerns regarding this proposed action were identified during internal and public scoping. The main issues associated with the management of black-tailed prairie dogs at Wind Cave National Park include the following:

Natural Resources

- Prairie dogs are a keystone species in a mixed-grass prairie and need to be preserved.
- Lethal control of wildlife species in a national park where the National Park Service is mandated to conserve natural resources and processes is a concern.
- The use of rodenticide as a management tool has the potential to affect non-target species of wildlife.
- Prairie dogs can affect habitat in a manner that encourages establishment of exotic plants.
- Prairie dogs change standing vegetation community composition (positive and negative aspects).
- A number of species dependent on large prairie dog complexes are imperiled or rare.
- The preservation of prairie dog populations provides a food source or habitat for rare species, such as the burrowing owl, black-footed ferret, and several species of raptors.
- Prairie dogs may, in combination with fire, grazing, and drought, increase the amount of early seral stages in communities of native climax vegetation.
- Unchecked growth of bison and elk can have an effect on ungulate populations and create competition for forage with prairie dogs.
- Prairie dogs alter plant phenology (relationship between climate and biological activity).

- The management plan needs to accommodate the dynamic (temporal and spatial) nature of prairie dog populations.
- Prairie dogs play a role in soil dynamics.
- Certain management tools, such as the use of rodenticide, may have local effects to natural resources, including vegetation, soils, and water quality.

Cultural Resources

- Some American Indians view the underground world as the home of the bison, a place where humans and bison emerged to populate the earth. Prairie dogs (“Little Farmers” who live underground) also are associated with this special place of beginning (Albers 2003).
- Certain plants that inhabit prairie dog towns and the clean soils brought up from below the surface of the earth are valued by tribes.

Public Relations and Perceptions

- In general, the local landowner perception of prairie dogs is very negative, which often leads to controversy in management of this species when prairie dogs disperse from public to private lands.
- In general, the overall public (beyond the local area) does not view prairie dogs negatively (Sexton et al. 2001, Gigliotti 2002, SDGFP 1996).
- The latest South Dakota black-tailed prairie dog management plan designates federal lands as “prairie dog focus areas” (a focus area is an area known to have many prairie dogs).
- How can public land managers collaboratively manage prairie dogs to benefit private landowners?
- Perception that the park is not doing anything to manage prairie dog populations hurts the park politically.
- Prairie dog colonies can present negative public perception with regard to landscape aesthetics (*e.g.*, burrows viewed as piles of dirt).

Public Health and Safety

- Prairie dogs may be host to fleas which can act as vectors for disease.
- Prairie dogs can compromise infrastructure integrity (*e.g.*, roadbanks or foundations).
- Implementation of some management actions may pose risks to public health and safety (*e.g.*, use of poisons, shooting).

Visitor Use and Experience

- Prairie dogs provide enjoyment for the public.

Park Operations

- Research opportunities regarding prairie dogs and their role in ecosystems abound in the park.
- Management and funding issues related to management and control of prairie dogs have a potential impact on park operations.

Impact Topics

Derivation of Impact Topics

Impact topics were used to focus the evaluation of the potential environmental consequences of the alternatives. Candidate impact topics were identified based on legislative requirements, executive orders, topics specified in *Director's Order #12 and Handbook* (NPS 2001b), *Management Policies 2001* (NPS 2000a), guidance from the National Park Service, input from other agencies, public concerns, and resource information specific to Wind Cave National Park. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

Impact Topics Included in this Prairie Dog Management Plan and Environmental Assessment

Soils, vegetation, and water quality were retained because of the likely effects from both the presence of prairie dogs and potential management actions. These natural resources are managed in accordance with *NPS Management Policies 2001* (NPS 2000a). In addition, water quality is regulated by the Clean Water Act, Executive Order 12088, and Executive Order 11990.

Wildlife was retained due to potential effects to the black-tailed prairie dog and other wildlife species from management tools proposed under each of the alternatives. This impact topic is addressed in accordance with *NPS Management Policies 2001* (NPS 2000a) and other wildlife laws, including the Migratory Bird Treaty Act.

Endangered and threatened species, including those identified by federal and state lists, was retained as an impact topic due to potential effects of management actions on species with potential to occur in the park, specifically the black-footed ferret and bald eagle (*Haliaeetus leucocephalus*), both federally listed species. This topic is addressed in accordance with the Endangered Species Act of 1973 and *NPS Management Policies 2001* (NPS 2000a).

Ethnographic resources and concerns were retained because of the role of prairie dogs in the history and belief systems of American Indian tribes traditionally associated with Wind Cave National Park. This impact topic is addressed in accordance with *NPS Management Policies 2001* (NPS 2000a) and *NPS-28, Cultural Resource Management Guidelines* (1998) that direct the National Park Service to consider ethnographic concerns when making management decisions.

Public health and safety and visitor use and experience are managed in accordance with the Organic Act of 1916 and NPS *Management Policies 2001* (NPS 2000a). These topics were retained due to potential effects on opportunities for visitor enjoyment and public health and safety from both the presence of prairie dogs and use of management tools.

Socioeconomics are managed in accordance with NPS *Management Policies 2001* (NPS 2000a) and 40 Code of Federal Regulations (CFR) 1500 Regulations for Implementing NEPA. This impact topic was retained for analysis because of potential effects from the management alternatives on the local economy, specifically with respect to effects on neighboring landowners.

In addition, sustainability and long-term management and potential conflicts with land use plans, policies and controls were each addressed in separate sections at the end of the “Affected Environment and Environmental Consequences” section of this document.

Impact Topics Dismissed From Further Analysis

The impact topics described in this section are not evaluated in detail in this environmental assessment. These impact topics were not identified during scoping as being of concern, nor is it anticipated that implementing any of the prairie dog management alternatives would substantially affect these park resources. Additional reasons for their dismissal are provided below.

Air quality: During the implementation of the black-tailed prairie dog management plan, there would be few impacts to air quality as a result of management activities. Vehicle emissions and small amounts of dust could be generated from the use of vehicles during management actions; however, they would only contribute short-term, negligible effects to local air quality. Therefore, air quality is dismissed from further analysis in this document.

Archeological resources: A number of different laws, regulations, and guidelines mandate treatment of archeological resources; relevant guidance for the National Park Service is included in 36 CFR 800, NPS *Management Policies 2001* (NPS 2000a), *Director’s Order 28, Cultural Resources Management* and NPS-28, *Cultural Management Guidelines* (1998), among others. Potential impacts of this prairie dog management plan on archeological resources were discussed with the South Dakota State Historic Preservation Officer on June 30, 2005 (Roddy pers. comm. 2005a). It was agreed that adverse impacts on archeological resources would be negligible (*no historic properties affected*) if the following stipulations are followed: 1) the park would verify the locations of known archeological sites in the vicinity of project areas and would clearly define these areas as sensitive resource areas that are off-limits for vehicle or crew access (without calling attention to the presence of archeological resources); 2) prairie dog management areas would be accessed via non-sensitive routes while the ground is frozen or is too dry to be easily disturbed; 3) the type of vehicle used to access project areas would be approved in advance with the park superintendent; 4) work crews would be educated about the sensitivity and importance of cultural sites, and about the need to protect any cultural/archeological resources encountered; and 5) work crews would be instructed of the illegality of collecting artifacts on federal lands (Archeological Resources Protection Act).

Cultural landscapes: Cultural landscapes are defined in the *NPS Management Policies 2001* (NPS 2000a) and in *NPS-28, Cultural Resource Management Guidelines* (1998). Cultural landscapes represent a complex subset of cultural resources resulting from the interaction between people and the land, and reflect the influence of human beliefs and actions over time on the natural landscape. Cultural landscapes are a living record of an area's past, providing a visual chronicle of its history. Normally, prairie dog towns are part of a natural viewshed and are not considered an element of a cultural landscape.

It is possible that prairie dog towns could be considered part of an ethnographic landscape associated with contemporary groups, such as American Indian tribes who typically use or value natural resources in traditional ways. However, the relationship between tribes and prairie dogs can be much better defined under the topic of "Ethnographic Resources" (above), so the topic of cultural landscapes has been dismissed and will not be evaluated further in this environmental assessment.

Ecologically critical areas or other unique natural resources: The proposed action would not affect any designated ecologically critical areas, wild and scenic rivers, or other unique natural resources, as referenced in the Wild and Scenic Rivers Act, *Management Policies 2001* (NPS 2000a), 40 CFR 1508.27, or the 62 criteria for national natural landmarks.

Energy requirements and conservation potential: The National Park Service reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources. The action alternatives would not appreciably change the park's short- or long-term energy use or conservation practices. The energy (primarily gasoline and diesel fuel) required for black-tailed prairie dog management would not be detectable on a daily or annual basis compared to energy use in Wind Cave National Park and surrounding area.

Environmental justice: Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that all federal agencies address the effects of policies on minorities and low-income populations and communities. None of the resource management alternatives would have disproportionate effects on minority populations as defined by the U.S. Environmental Protection Agency's 1996 guidance on environmental justice.

Geology: Because activities related to resource management would have effects only to aboveground resources within the park, and not to any subsurface areas, geology is dismissed from further analysis in this document.

Historic structures: Guidance for management of historic structures in parks is included in the *NPS Management Policies 2001* (NPS 2000a) and *NPS-28, Cultural Resource Management Guidelines* (1998). No historic structures would be affected by anticipated resource management activities, so this topic is not evaluated further in this environmental assessment.

Indian trust resources: Indian trust assets are owned by American Indians but are held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial

Order 3206, American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, the Endangered Species Act, and Secretarial Order 3175, Departmental Responsibilities for Indian Trust Resources. According to Wind Cave National Park staff, Indian trust assets do not occur within the park. Therefore, there would be no effects on Indian trust resources from any of the alternatives.

Museum collections: The National Historic Preservation Act, 36 CFR 800, American Antiquities Act, Archaeological Resources Protection Act, Archaeological and Historic Preservation Act, Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation, Director’s Order 28 (1998), and NPS *Management Policies 2001* (NPS 2000a) guide the analysis of effects on museum collections under NEPA. None of the park’s museum collections would be affected by any of the alternatives under evaluation.

Prime and unique agricultural lands: The Council on Environmental Quality 1980 memorandum on prime and unique farmlands states that prime farmlands have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique agricultural land is land other than prime farmland that is used for production of specific high-value food and fiber crops. No such agricultural sites are found in Wind Cave National Park due to the rocky terrain, arid environment, and short growing season.

Wetlands and floodplains: Executive Orders 11988 and 11990, Floodplain Management and Wetlands, respectively, require analysis of impacts on floodplains and regulated wetlands. Management actions included in the alternatives would have no effect on wetlands or floodplains. One ephemeral wetland area is present in the Bison Flats prairie dog colony. However, no management actions associated with this plan would affect this wetland, or any other wetland. No actions taken under any of the alternatives would directly affect floodplains; potential increases in prairie dog populations would have no effect on floodplain values or function. Black-tailed prairie dog management effects on waters in the areas of effect is addressed under the section “Water Resources”.

Wilderness: Wind Cave National Park does not contain nor is it adjacent to any designated or proposed wilderness areas. Approximately 96.5 percent of the park’s surface is included in the “natural zone” (NPS 1994a). Within this area, signs of human use and development are widely present and easily visible. Wind Cave National Park is not under consideration for wilderness designation under the 1964 Wilderness Act, Director’s Order 41, or NPS *Management Policies 2001* (NPS 2000a).

Urban quality, historic and cultural resources, and design of the built environment: This impact topic was considered because it is required under Council on Environmental Quality guidance. However, the proposed actions would not result in any effects to urban quality or affect the built environment. Historic and cultural resources are addressed independently under “Cultural Resources”. As a result, this impact topic was dismissed from further consideration.

ALTERNATIVES CONSIDERED

The alternatives analyzed in this assessment include three action alternatives and the no action / continue current management alternative (Alternative A, the No Action Alternative). The action alternatives were designed to embody the goals and desired conditions described above for a healthy prairie dog population as well as address the issues related to management of the prairie dog. These issues are described in the “Purpose and Need” section.

The No Action Alternative was used as a baseline to compare and analyze the effects of the three alternative management approaches. This was the context for determining the relative magnitude, intensity, and characteristics of management action effects on natural, cultural, social and economic resources (NPS 2000a). The No Action Alternative is referred to as “Alternative A, the No Action Alternative” in this environmental assessment.

A range of resource management alternatives was developed using comments obtained through internal and public scoping that could meet the long-term desired condition and the management objectives and address management issues. Actions or alternatives that were not realistically feasible or did not adequately meet the project purpose and need were dismissed from further consideration. The alternatives dismissed from consideration are addressed in the section “Alternatives Considered but Dismissed.” Extreme actions, including eliminating all prairie dog acreage and taking action to have all potential prairie dog habitat occupied, were eliminated from consideration because of conflicts with other resources and National Park Service policies. The remaining action options were selected from the remaining acreage range that would meet the objectives of the management plan. Ranges of acreages were selected to allow for natural variation in response to environmental variables and to best represent the widest range of alternatives that were considered feasible and realistic.

Table 1 presents a summary of the characteristics of all the alternatives that were considered for managing future black-tailed prairie dog populations in the park.

TABLE 1. KEY RESOURCE MANAGEMENT CHARACTERISTICS	
Alternative	Characteristic
A No Action	<ul style="list-style-type: none">• Active population management of prairie dogs would not occur; isolated problem situations or areas would be treated• The park would continue to relocate prairie dogs from the developed areas (the equivalent of the No Prairie Dog Zone defined in the action alternatives)• No population acreage target for prairie dog management; allow population to expand in accordance with natural regulating factors• Approximately 2,200 acres of prairie dog colonies are currently in the park

TABLE 1. KEY RESOURCE MANAGEMENT CHARACTERISTICS

Alternative	Characteristic
B High Acreage Target (3,000 to 5,000 acres of prairie dog colonies)	<ul style="list-style-type: none">• All management tools would be available to achieve the increase in colony acreages• Includes an “Active Management Zone” of about ¼ mile around the interior perimeter of the park where prairie dogs would be controlled if there were potential for conflict with adjacent landowners• Includes a “No Prairie Dog Zone” that includes the developed areas of the park where prairie dogs would be removed
C Mid-range Acreage Target (1,000 to 3,000 acres of prairie dog colonies) the Preferred Alternative	<ul style="list-style-type: none">• All management tools would be available to meet the desired acreage commitment• Includes a No Prairie Dog Zone
D Low Acreage Target (300 to 1,000 acres of prairie dog colonies)	<ul style="list-style-type: none">• All management tools would be available to meet the desired acreage commitment• Includes a No Prairie Dog Zone

ALTERNATIVE A, THE NO ACTION ALTERNATIVE

This management alternative would continue current prairie dog management within Wind Cave National Park. Although there are management goals set forth in the 1982 Prairie Dog Management Plan, including the use of hormonal sterilants and a 700-acre target for prairie dog colonies, these goals are no longer desirable because the 1982 plan is not consistent with the latest ecological or wildlife science.

With this management approach, the desired future condition would consist of the following major features:

- No population acreage target for prairie dog management, as this alternative would allow the population to expand or contract in accordance with natural regulating factors;
- Adequate and sustainable forage conditions would be unknown for bison, elk, and other grazing species; and
- Currently, the park live traps and relocates prairie dogs to interior areas of the park, with particular emphasis on trapping and removal from the corral area, used for managing the bison herd, and developed areas of the park. These management actions would continue under this alternative on an as needed basis.

The No Action Alternative would continue current management of black-tailed prairie dogs in Wind Cave National Park. The prairie dog management plan prepared in 1982 is outdated and its

objectives can no longer be achieved, as previously described in the “Purpose and Need” section. Under the No Action Alternative, prairie dog population growth or decline would fluctuate in accordance with natural population regulating factors. Recent surveys of prairie dog colonies in the park, completed in 2004, have measured the total prairie dog acreage at over 1,800 acres, but park staff estimate that because of the recent prolonged drought, colonies expanded from 1,855 in 2004 to approximately 2,200 acres in 2005 (NPS 2004f). Continuing current management would result in an unspecified population in the park, which could vary widely from a few hundred acres to several thousand acres. The expansion of prairie dog colonies in the park could continue if the drought continues. Habitat modeling developed by park staff shows that the park has 7,203 acres of suitable habitat and 1,363 acres of preferred habitat for prairie dogs equaling a total of 8,566 potential acres of prairie dog habitat (NPS 2004f). Only suitable and preferable habitat were included in the calculation of potential prairie dog habitat because so few acres were categorized as marginal, that they would be inconsequential to the total. As of March 2004, 16 percent of the suitable habitat and 40 percent of preferred habitat are currently occupied by prairie dogs (NPS 2004f).

Lethal control was last used in 1997, when the park poisoned prairie dogs along the Custer State Park boundary and the northwestern corner of the park. From 1999 until August 2004, the black-tailed prairie dog was a candidate for listing as a federally threatened species under the Endangered Species Act. As a result, the National Park Service discontinued using lethal control as a management option for the black-tailed prairie dog, and this approach continues. On October 14, 2004, the NPS Midwest Regional Director notified all Midwest Region national park units with black-tailed prairie dog populations that lethal control methods would only be acceptable after the park unit completed a prairie dog management plan with the requisite NEPA compliance (NPS 2004a).

Vegetation management activities that affect prairie dog colonies in the park include mowing, weed-pulling, potential use of herbicides, and release of biological control agents to control exotic plant species. Under Alternative A, prairie dog colonies would continue to be mowed to limit thistle and other exotic plant species invasions. Prescribed burns would continue to occur in the park as described in the Wind Cave National Park Fire Management Plan (NPS 1999b). Burning would be primarily used to open up canopy cover, although the influences on prairie dog colonies (potential for colonies to expand into burned grassland areas) would also be considered.

Prairie dog colonies would continue to be mapped using a global positioning system (GPS) and range productivity transects would be sampled.

Bison, elk, and vegetation management plans, which are being developed concurrently with this prairie dog management plan, would assume prairie dog populations would be approximately 2,200 acres based on existing conditions under the No Action Alternative.

No overarching management actions would be taken to redistribute prairie dogs away from park boundaries. Currently, park staff communicates with neighbors who have prairie dog concerns, but no direct control actions are taken. Park staff would continue to meet with neighbors with regard to their concerns about prairie dogs dispersing from the park onto private property, but control actions taken in response would likely continue to be minimal.

Visitors would continue to be able to view prairie dogs in close proximity via pullouts along U.S. Highway 385, state route 87, and park roads. There are pullouts specifically designed for viewing prairie dogs in the Bison Flats area and at the junction of U.S. Highway 385 and State Route 87. Visitors would continue to be reminded not to feed wildlife, including prairie dogs, through evening programs, hikes, newsletters, and signs.

Research opportunities for studying prairie dogs in the park would continue. Issuance of permits and ensuring permit compliance would continue to occur. The park would occasionally be able to provide limited funding for prairie dog research. Wind Cave National Park, along with Badlands National Park, has historically been a control site for plague investigations. This would continue under Alternative A.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

This section provides information about elements associated with each of the action alternatives. These elements would be the same for each alternative and in some cases include actions that currently take place (*e.g.*, monitoring of colony size and locations).

The park's enabling legislation mandated the protection and management of bison, elk, and pronghorn. In addition, recent studies have confirmed the genetic purity and uniqueness of the Wind Cave bison and as a result, management for their protection and survival is paramount. With this in mind, a forage based management strategy for the action alternatives was selected, as it allocates forage to the grazing species within the park. Each action alternative presents information as to impacts that can be expected on all resources as a result of forage allocation.

Desired Future Condition of the Black-tailed Prairie Dog Population and Habitat

This prairie dog management plan intends to maintain a black-tailed prairie dog population that can persist through environmental perturbations and coexist with other resources, particularly species that depend on prairie dogs and their habitat, ungulate grazers, and vegetation. The desired condition would include a prairie dog population, in terms of areal extent and distribution, that can withstand or at least recover from stochastic events such as prolonged drought or a plague epizootic.

Habitat conditions in prairie dog colonies would include vegetation communities that are comprised of native species with a complement of plant species that reflects the typical species composition that has been documented in large, healthy prairie dog complexes (Agnew *et al.* 1986; Detling and Whicker 1988). The fauna that are typically associated with the prairie dog would be present and the interdependence between species that is specific to the altered prairie dog colony habitat (*i.e.*, system of burrows, soil mixing, increased water infiltration) would be exhibited.

These conditions would be achieved primarily by letting natural processes proceed to the fullest extent possible. The dynamic nature of prairie dog colony establishment and movement would be allowed to occur mostly uninterrupted. An exception to the natural dynamic movement of prairie dogs would occur in those locations where the desired condition includes the absence of prairie dogs. These locations include the developed zones (*e.g.* campground and administrative area)

and based on a case-by-case evaluation, those parts of the park adjacent to private lands where landowners express an unwillingness to have prairie dogs disperse to their lands from the park. Non-lethal and lethal population controls (identified below) would be used to manage prairie dogs to meet needs in these particular locations.

The vegetative resource would be maintained, both in and out of prairie dog colonies, with a full complement of native species. The quantity of available forage would be sufficient to support prairie dogs, bison, elk, and other populations that rely on the vegetative resource. The desired population sizes of other major grazers in the park are currently being developed in separate resource management plans.

Visitors would continue to view prairie dogs in their colonies, observing their foraging and social habits in conjunction with NPS interpretive messages, which would help park visitors understand the role that prairie dogs play in the prairie ecosystem.

The specific actions to implement this prairie dog management plan are dependent on the size of the prairie dog population selected by the National Park Service after reviewing the analysis of environmental effect in the environmental assessment. However, all available actions needed to implement the plan have been identified and are presented below.

Management Tools

Each population/habitat management approach would allow for the use of a variety of management tools, each of which can be categorized according to its effects on a prairie dog population and the type of method.

- *Increasing tools* would promote the expansion of prairie dog colonies and population;
- *Maintenance tools* would assist in maintaining prairie dog populations at a desired size; and
- *Decreasing tools* would reduce prairie dog populations and discourage growth and expansion of colonies.

Management tools available for use in each of the action alternatives include:

Lethal Control Tools

- *Lethal control (rodenticide – zinc phosphide)*: This is a decreasing tool that would be used under the action alternatives on an as-needed basis. Rodenticide could be used to reduce prairie dog populations. It would work quickly, although prairie dog populations could rebound quickly as new individuals immigrate (Montana Fish, Wildlife, and Parks 2005).
- *Lethal control (shooting by park staff)*: This is a decreasing tool that would be used on a limited basis for controlling prairie dog populations in the park. It would be quick and effective on a small, local scale, although prairie dog populations could still rebound quickly.

- *Natural predators*: Existing natural predators in the park, including hawks, owls, coyotes, bobcats, snakes, and badgers, would continue to provide a small level of prairie dog population control. One black-footed ferret family of four will eat 763 prairie dogs per year, under typical conditions (Biggins *et al.* 1993). In South Dakota, prairie dogs comprised 91 percent of the black-footed ferrets diet (Sheets *et al.* 1972 in Miller *et al.* 1996). The U.S. Fish and Wildlife Service Black-footed Ferret Recovery Program would determine if a ferret reintroduction effort would be suitable within Wind Cave National Park in the future. This tool could be either a decreasing or a population-maintenance tool.

Non-lethal Control Tools

- *Live trap and relocate*: By live trapping and relocating prairie dogs into areas in the park where colony expansion would be desirable, local prairie dog populations at the relocation site could be increased. Live trapping prairie dogs and either relocating to a willing taker outside the park or donating to the ferret recovery program could reduce prairie dog populations in the park.

Habitat Management

- *Managing other species' grazing levels*: This tool could be used to increase, maintain, or decrease prairie dog populations by controlling the amount of forage available to prairie dogs. By managing other species' opportunities to graze near prairie dog towns, bison and other species can open up the grassland matrix to new colonization by prairie dogs or expansion of existing colonies (High Country News 1999). Once a desirable population level of prairie dogs is reached, maintaining the grazing levels of the primary grazers in the park (*i.e.*, bison and elk) at a constant level could be a maintenance tool for prairie dogs. Wind Cave National Park maintains their bison herd at approximately 350-400 individuals. Past population goals for elk using the park has been between 350 and 400 animals, a population that may need to be adjusted.
- *Vegetation mowing and mechanical thinning*: These methods could be used to encourage expansion or movement of prairie dogs to new areas. Conversely, by limiting the use of these tools, as in the case of mowing to control exotic plant infestations, the areas where prairie dogs would expand could be controlled to some degree. The use of mowing and thinning of pine trees could be used as a colony increasing activity.
- *Natural barriers*: Because prairie dogs are limited in their dispersal by habitat preferences, the presence of suitable soil type, slope, and vegetation could control where prairie dog colonies are located on the landscape (NRCS 2001). This tool is primarily a population maintenance tool.
- *Physical barriers*: Fencing or other mechanical barriers (*e.g.*, hay bales, slash, silt fence) could be erected to limit prairie dog dispersal. Like natural barriers, physical barriers could maintain prairie dog populations in a certain area (Witmer and Hoffmann 2002).
- *Landowner incentives*: Landowner incentives could be developed to provide compensation to adjacent and local landowners for maintaining prairie dogs or prairie dog habitat on their property. Currently there is no mechanism within the National Park Service to accomplish this and funds would have to come from donors.

- *Conservation easements:* Conservation easements could be negotiated with adjacent and local landowners through local, regional, or national land trusts or other organizations in order to protect prairie dog habitat adjacent to the park.

The management tool that would be used may be dependent on the request from the adjoining landowner or land manager. For example, zinc phosphide treatment is recommended only during periods of dormant vegetation. Thus, the use of zinc phosphide rodenticide would be an ineffective or inappropriate treatment for the spring and summer when vegetation is actively growing. During active growing seasons, the management response may be live trapping or direct reduction, depending on the extent of the control action. Live trapping may also be used for initial control action followed by direct reduction if acreage is too great. The treatment to be applied would also be dependent on the size of area requiring control. For example, trapping would be ineffective for large areas and poison may not be necessary for small areas.

Under all alternatives, private landowners adjacent to public lands in South Dakota are eligible for prairie dog control assistance from South Dakota Department of Game, Fish and Parks on an annual basis, if there is sufficient evidence that prairie dogs are dispersing from public lands. The potential assistance granted to private landowners would not be affected by any of the action alternatives.

Management Zones

Two management zones, to be implemented in combination with the action alternatives, were developed by park staff. The purpose of these zones would be to define where specific prairie dog control actions could be implemented and the rationale for using control in those zones. A No Prairie Dog Zone would be associated with each of the action alternatives (Alternatives B, C, and D) and is described below. An Active Management Zone would be included in Alternative B only, and is described in Alternative B below. These zones are not specifically defined in the park's General Management Plan (NPS 1994a), but would not conflict with the General Management Plan. Although, under the No Action Alternative the park traps and translocates prairie dogs from the developed areas, no management zone has been formally designated.

Under this new prairie dog management plan, colonies would be allowed and in some cases encouraged to expand, but no formal zone dedicated to continued existence or expansion of prairie dog colonies was created. However, the general location of this area can be defined as the interior of the park or areas where the potential for conflict with neighboring land uses would be minimal.

The **No Prairie Dog Zone** would include developed areas of the park (*e.g.*, the park administrative and housing area [anywhere inside the fence surrounding the area], campground area [anywhere inside the fence surrounding the campground], and around park structures [*e.g.*, buildings, roads, under equipment]). If prairie dogs burrow in this zone, they would be actively removed by any of a number of techniques. Non-lethal controls, such as trapping and relocation to the interior of the park, away from any park infrastructure, would be considered before lethal controls would be employed. However, if the non-lethal control techniques are not practical or prove to be ineffective, lethal controls would be used as necessary until non-lethal tools could be employed.

Monitoring

All action alternatives would include a monitoring program to determine the acreage used by prairie dogs and the size of the park's population and to ensure the acreage level and population size would be consistent with the objectives of the plan (described in the "Purpose and Need" section of this document). Monitoring would include measuring prairie dog colony acreages, sampling range productivity transects, and taking prairie dog burrow counts.

Contingency Plan for Plague

Sylvatic plague (also known as bubonic plague in cases of human infection) is a disease caused by the bacterium *Yersinia pestis* that is often responsible for 100 percent mortality in affected black-tailed prairie dog colonies. Plague is cited as one of the primary causes of widespread prairie dog population declines (Cully 1993). Black-tailed prairie dogs show neither effective antibodies nor immunity. If there are any survivors, they do not exhibit resistance to plague; surviving animals appear to have avoided death only by the remote chance of avoiding exposure. The disease is transmitted and spread by fleas (Barnes 1993). Currently plague is known from all parts of the historic range of black-tailed prairie dogs, although plague has only recently been detected in several isolated locations in South Dakota. No evidence of plague has been detected in the prairie dog populations at Wind Cave National Park.

Wind Cave National Park would develop a contingency plan for sylvatic plague in consultation with the U.S. Fish and Wildlife Service. Compliance on proposed actions under the contingency plan would be completed separately from this environmental assessment.

Interpretation and Research

Under all action alternatives, visitors would continue to be able to view prairie dogs in close proximity via pullouts along U.S. Highway 385, State Route 87, and park roads.

Research opportunities for studying prairie dogs in the park would continue. Issuance of permits and ensuring permit compliance would continue to occur. The park would occasionally be able to provide limited funding for prairie dog research. Wind Cave National Park, along with Badlands National Park, has historically been a control site for plague investigations. This would continue under all action alternatives.

ALTERNATIVE B: HIGH ACREAGE TARGET

The focus of this management approach is to achieve a larger prairie dog population distributed over a larger portion of the park. This alternative was chosen to represent the upper end of the range of acreage alternatives. Maximization of the prairie dog acreage to these levels provides an opportunity to determine the potential effects of a population larger than what currently exists, but within realistic bounds.

With this management approach, the desired future condition for the prairie dog population in Wind Cave National Park would consist of the following major features:

- Colonies comprising a range of 3,000 to 5,000 acres, and
- Adequate and sustainable forage conditions for bison and elk.

Alternative B would manage for prairie dog colonies distributed over an area ranging between 3,000 and 5,000 acres. All management tools previously described would be available for use by park staff. Prairie dog colonies may be expanded using tools such as mowing and thinning, trapping and relocating to encourage expansion. Based on current acreage estimates of about 2,200 acres of prairie dog colonies in the park, it is assumed that actions taken under this alternative would initially focus on increasing colony acreage. Over time as colony acreage targets were achieved, the focus of management activities would be on maintaining the desired acreage.

An Active Management Zone would be created with Alternative B. This zone would be comprised of the area between the park boundary and a line approximately ¼ mile inside the park boundary (about 5,700 acres). The National Park Service would meet with all adjacent and local landowners with potential to be affected by prairie dogs dispersing from the park upon approval of this plan. The purpose of the meeting would be to determine the landowner's willingness to accept prairie dogs on their land.

Within the Active Management Zone, prairie dog presence and activities would be kept to a minimum and may be eliminated, especially if prairie dog migration or dispersal from the park were documented in specific areas. Landowner concerns about prairie dogs migrating from the park, based on monitoring and/or substantiated by NPS resource personnel, would be one basis for implementing control actions within the Active Management Zone. Active management within this zone would most likely occur along the southeast, northeast and northwestern corners of the park where prairie dog colonies are close to the park boundary. There may be years when the presence of, or activities by, prairie dogs in the Active Management Zone would not create a potential problem for neighbors. In such cases, prairie dogs within the park would not be controlled unless movement outside the park is substantiated by NPS staff or was observed during monitoring. If prairie dogs were present in parts of the Active Management Zone where there was no potential for conflict with neighboring land use, such as adjacent to U.S. Forest Service land, it is unlikely any control actions would be implemented. Control decisions would be based on review of the most current information compiled by park resource management staff and would be approved by the park superintendent.

A No Prairie Dog Zone would be implemented in developed areas (see "Management Zones" in "Elements Common to All Action Alternatives").

Colony acreages within the rest of the park, but outside the Active Management and No Prairie Dog Zones, would be allowed and encouraged to increase until the upper limit acreage threshold associated with Alternative B (*i.e.*, 5,000 acres) was reached or approached. This would trigger control actions to maintain the prairie dog population at the size stipulated by the management plan. Exceeding the upper limit of the acreage range would not be acceptable because of excess constraints on forage availability. Lethal control would be used minimally under this alternative because the primary focus of the alternative would be to expand and maintain the size of prairie dog colonies.

Figure 4 shows a conceptual map of potential colonies in Wind Cave National Park at the maximum acreage associated with Alternative B (*i.e.*, 5, 000 acres).

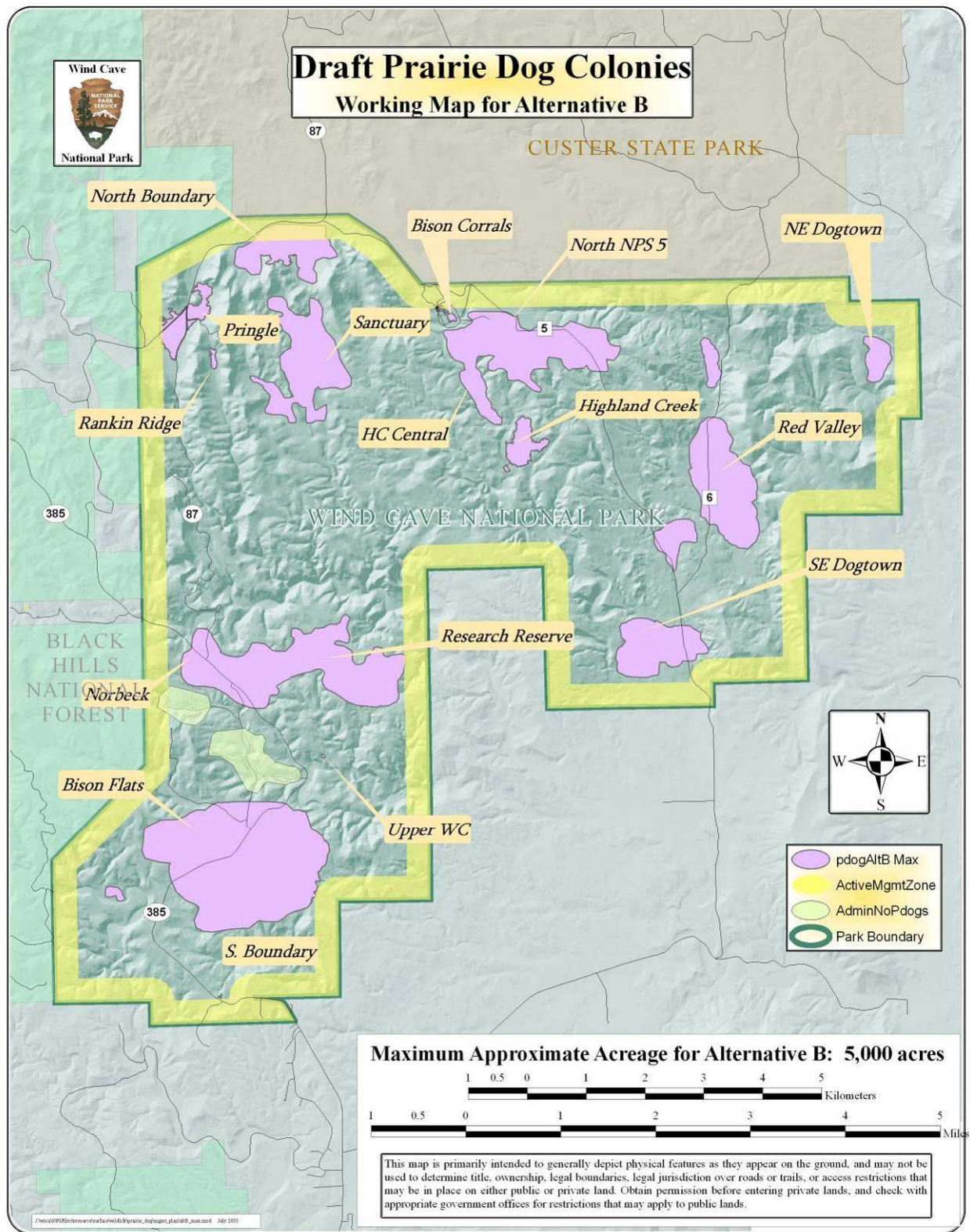


FIGURE 4. CONCEPTUAL MAP OF 5,000 ACRES OF PRAIRIE DOGS UNDER ALTERNATIVE B

ALTERNATIVE C: MID-RANGE ACREAGE TARGET –THE PREFERRED ALTERNATIVE

Alternative C is the NPS Preferred Alternative and defines the rationale for the action in terms of resource protection and management, visitor and operational use, and other applicable factors. This alternative was chosen to represent the middle of the range of acreage alternatives and to include the existing size of the prairie dog population. Analysis of the prairie dog population within 1,000 to 3,000 acres provides an opportunity to determine the potential effects of a population that has developed with no widespread management actions taken to control the population. In effect, this alternative represents natural regulation, with the acreage range allowing for natural variation.

Alternative C has been identified as the Preferred Alternative because it meets the objectives associated with the purpose and need for the proposed action better than Alternatives A, B, or D, and it is the environmentally preferred alternative, as described later in this chapter. In this alternative, the size of prairie dog colonies in the park would be maintained at a sustainable level, for both the long-term viability of the prairie dog population and the availability of forage and habitat for other species within the park.

Under the Preferred Alternative, the management approach would enable the park to achieve a prairie dog population ranging near the current population size and to incorporate as much accommodation as possible in addressing potential conflicts with neighboring land uses. Incidences of prairie dogs dispersing beyond park boundaries onto adjacent land would be addressed on a case-by-case basis in support of a good neighbor policy, which would be characterized by reasonable and prudent methods to manage movement of prairie dogs out of the park, while still maintaining the prairie dog's ecological role in the park.

With this management approach, the desired future condition for the prairie dog population in Wind Cave National Park would consist of the following major features:

- Colonies comprising a range of 1,000 to 3,000 acres, and
- Adequate and sustainable forage conditions for bison and elk.

Alternative C would manage for a black-tailed prairie dog population ranging between 1,000 and 3,000 acres. All management tools previously discussed would be available for use by park staff. Prairie dog colonies would be maintained using tools such as mowing and thinning, trapping and relocating, and lethal control option when necessary. Based on current acreage estimates of about 2,200 acres of prairie dog colonies in the park, it is assumed that actions taken under this alternative would focus on maintaining colony acreage. Over time as colony acreages change, the focus of management activities would be to keep colony acreage within the prescribed range. The primary locations where population control actions would be implemented would likely be near the park boundary, to minimize conflicts with neighboring land uses. The Preferred Alternative would maintain a population range more likely to be sustainable under threats of potential extirpation by natural or human-caused reduction.

Under the Preferred Alternative, a No Prairie Dog Zone would be implemented in developed areas (see “Management Zones” in the “Elements Common to All Action Alternatives”).

There would be no formal Active Management Zone in this alternative, but prairie dog activities adjacent to park boundaries would be monitored and appropriate management actions would be taken to help prevent prairie dog migration and dispersal out of the park when substantiated on a case-by-case basis. When colony acreages reach or approach the upper threshold limits associated

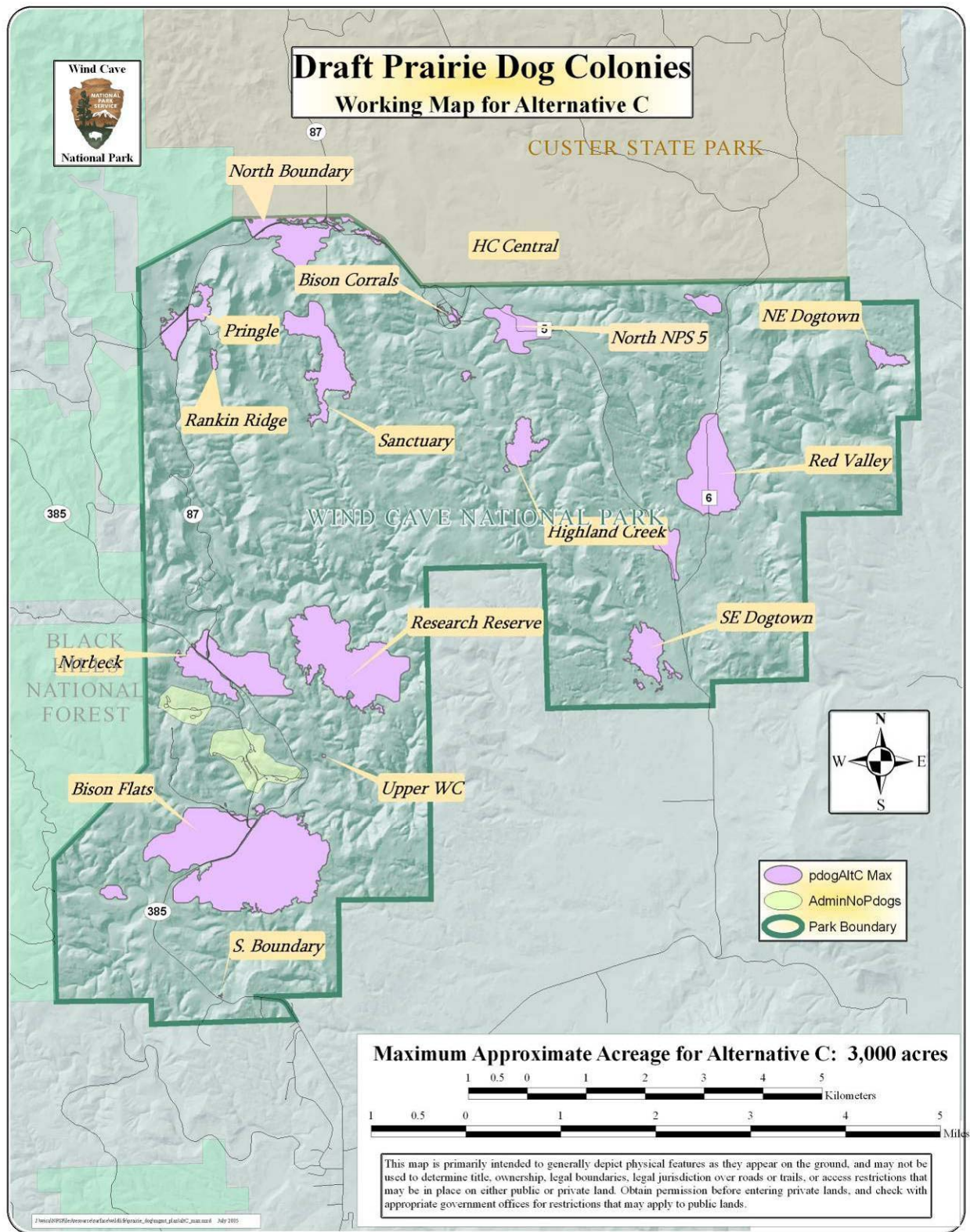


FIGURE 5. CONCEPTUAL MAP OF 3,000 ACRES OF PRAIRIE DOGS UNDER ALTERNATIVE C

with Alternative C (*i.e.*, 3,000 acres), control activities would be implemented to stay within the prescribed acreage range.

Figure 5 shows a conceptual map of potential colonies in Wind Cave National Park at the maximum acreage of Alternative C (*i.e.*, 3,000 acres).

ALTERNATIVE D: LOW ACREAGE TARGET

The focus of this management approach would be to achieve a prairie dog population smaller than the current population. This approach would be used to minimize the potential for prairie dog migration and dispersal from the park and potential conflict with neighboring land uses. Incidences of prairie dogs dispersing beyond park boundaries onto adjacent land would be addressed on a case-by-case basis in support of the good neighbor policy. This alternative was chosen to represent the low end of the range of acreage alternatives and to include the size of the prairie dog population that existed when population control methods were employed. Analysis of the prairie dog population within the 300 to 1,000 acre range provides an opportunity to determine the potential effects of an actively controlled population that would be maintained below the size currently present in the park.

With this management approach, the desired future condition for the prairie dog population in Wind Cave National Park would consist of the following major features:

- Colonies comprising a range of 300 to 1,000 acres, and
- Adequate and sustainable forage conditions for bison and elk.

The black-tailed prairie dog acreage in the park under Alternative D would range between 300 and 1,000 acres. All management tools discussed in “Elements Common to All Action Alternatives” would be available for use by park staff. Those tools decreasing the prairie dog population would be favored during the initial stages of this alternative because the colony acreage would need to be reduced substantially to meet the target range. Lethal control would likely be used to eliminate prairie dog colonies near the boundary of the park and in those interior colonies where reduction would be desired. The use of tools likely to expand colony acreage, such as mowing and thinning trees adjacent to existing colonies would be timed on a seasonal basis to avoid colony growth.

In Alternative D (see Figure 6), extensive prairie dog control efforts would be implemented throughout the park until colonies were reduced sufficiently to reach or approach the management acreage goal. After the target acreage was attained, management actions would focus on the maintenance of colony sizes. This would likely include elimination of prairie dogs along park boundaries using several of the population control techniques.

A No Prairie Dog Zone would be in place around developed areas (see “Management Zones” in “Elements Common to All Action Alternatives”).

Figure 6 shows a conceptual map of potential colonies in Wind Cave National Park at the maximum acreage of Alternative D (*i.e.*, 1,000 acres).

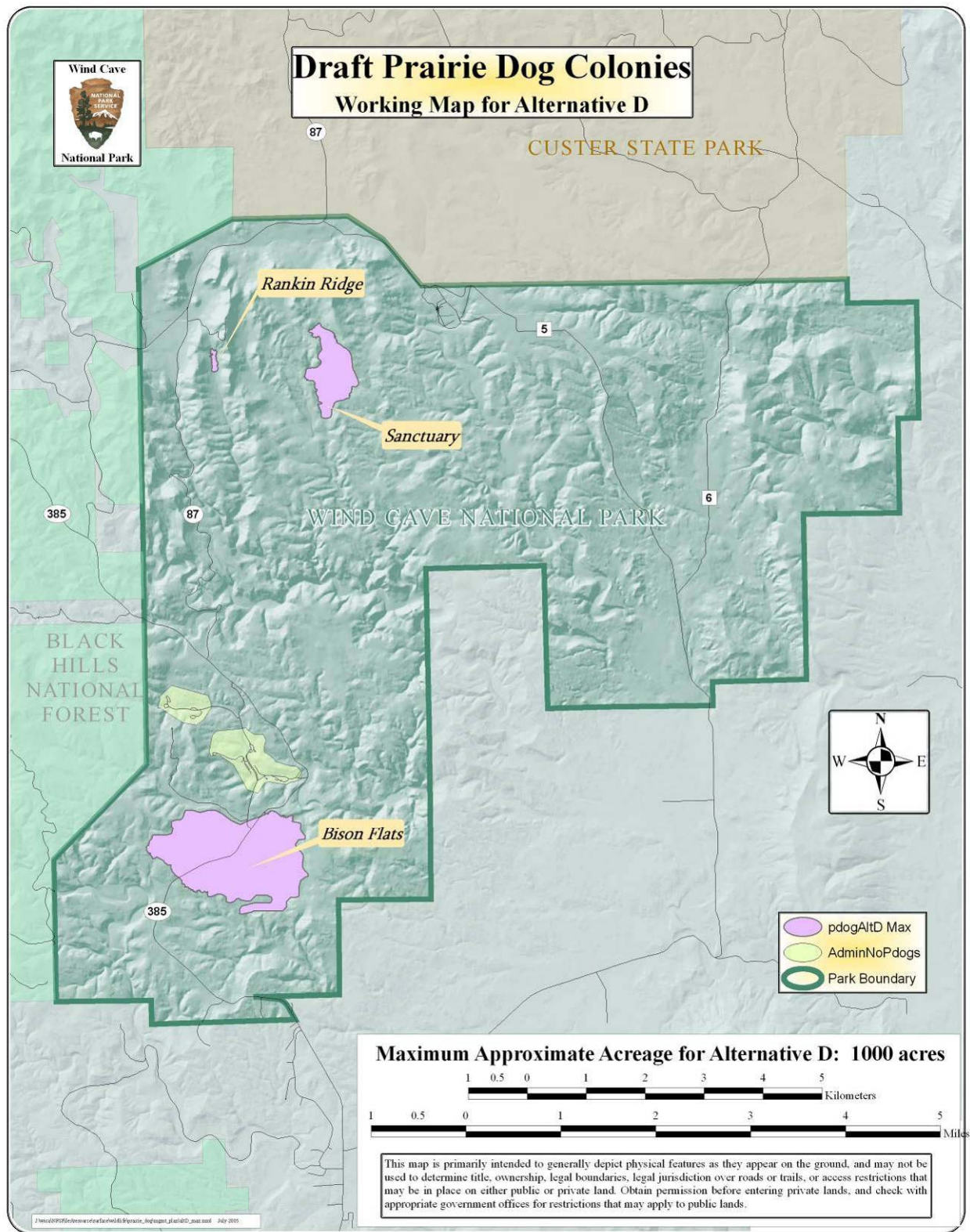


FIGURE 6. CONCEPTUAL MAP OF 1000 ACRES OF PRAIRIE DOGS UNDER ALTERNATIVE D

MITIGATION MEASURES

Under each management approach, best management practices and mitigation measures would be used to prevent or minimize potential adverse effects associated with the prairie dog management plan.

Resource protection measures undertaken during project implementation would include, but would not be limited to, those listed below in Table 2. The impact analyses in the “Affected Environment and Environmental Consequences” section were performed assuming these best management practices and mitigation measures were implemented and the analyses take the minimization of effects into account.

TABLE 2. BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

Public Health and Safety

Park neighbors, park visitors, and local residents would be notified of all activities with the potential to impact them (*e.g.*, shooting by park staff or use of rodenticides).

Cultural Resources

The park would verify the locations of known archeological sites in the vicinity of project areas and would clearly define these areas as sensitive resource areas that are off-limits for vehicle or crew access (without calling attention to the presence of archeological resources). Work limits in the vicinity of important cultural resources would be clearly defined.

Work crews would be educated about the sensitivity and importance of cultural sites, and about the need to protect any cultural/archeological resources encountered. This would include instructions for notifying appropriate park staff and other required agencies if human remains were discovered.

Work crews would be instructed of the illegality of collecting artifacts on federal lands (Archeological Resources Protection Act).

Prairie dog management areas would be accessed using non resource-sensitive routes, while the ground is frozen or is too dry to be easily disturbed, and the type of vehicle used to access project areas would be cleared in advance by the park superintendent.

Natural Resources

Selection of prairie dog control measures would be evaluated by park resource management staff to minimize adverse impacts on prairie dog populations outside areas where control would be implemented.

Use of control measures would be evaluated to minimize potential impacts on non-target species (plants and animals), including species that make use of prairie dog habitat or depend upon them as a prey source.

When raptors are known to be present or reliant on prairie dogs as prey (winter and migration months or breeding seasons, respectively), and if rodenticide were used for prairie dog control, above ground carcasses would be removed quickly, so bald eagles and other protected raptor species do not prey upon poisoned carcasses.

ALTERNATIVES CONSIDERED BUT DISMISSED

Two alternative population management approaches were considered and dismissed from detailed analysis. These approaches failed to meet the project objectives, included actions that generated unacceptable levels of resource impacts, or were generally unacceptable under the terms of alternative elimination found in Director's Order 12, Section 4.5.E.6. The nature of the dismissed alternatives and the rationale for their rejection are outlined below.

- **Eradication of all prairie dogs in the park:** This approach represents one extreme in the continuum of prairie dog management options. The reasons that this management approach was not retained for full analysis was that it would be against NPS policies specified in *NPS Management Policies 2001* (NPS 2000a) to remove a native species from the park, the park is mandated to protect its resources, and the adverse impacts on other species that are interdependent with the prairie dog would be unacceptable.
- **Expansion of prairie dogs to all areas of suitable habitat in the park:** This approach was considered to represent the opposite extreme from the preceding one in the continuum of prairie dog acreage options. However, it was not retained for full evaluation because it would likely be infeasible for prairie dogs to occupy that large an area in the park (at the present time, about 16 percent of the habitat classed as suitable is occupied by prairie dogs, while about 40 percent of preferred habitat is occupied by prairie dogs). Limits on the efficacy of management tools and the actions of park staff to expand colonies to over four times their current size would be the basis for this infeasibility. Continuous actions to expand the size of prairie dog colonies would be required, at the expense of the vegetation resource and other grazing species, to implement such an approach. This would violate the NPS mandate to maintain sustainable resources and protect vegetative resources.

THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will best promote national environmental policy expressed in the National Environmental Policy Act as well as NPS *Director's Order #12* (NPS 2001b) and *NPS Management Policies 2001* (NPS 2000a). The environmentally preferred alternative would cause the least damage to the biological and physical environment, and would best protect, preserve, and enhance historical, cultural, and natural resources.

Section 101(b) of the National Environmental Policy Act identifies six criteria to help determine the environmentally preferred alternative. The act directs that Federal plans should:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

4. Preserve important historical, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Continuing the current conditions under Alternative A would be less effective in meeting these criteria than Alternative C because Alternative A does not meet criterion 3 as well as Alternative C. The prairie dog population size and colony acreage under Alternative C would be similar to Alternative A, but Alternative C would provide a means for a more methodical approach to ensure sustainability and viability of the population over the long term and would have achievable goals and objectives. Alternative C would address potential conflicts with neighboring land uses on a proactive case-by-case basis, thus minimizing any undesirable or unintended consequences.

Alternative C would be environmentally preferred over the other action alternatives because it would better meet the six criteria listed above. With implementation of Alternative C, the National Park Service would better be able to pursue restoration of a complete ecosystem because the prairie dog colony acreage would provide adequate area to support those species using this habitat without degrading the resource. Vegetative resources would be sustainable considering the foraging allocation that would occur with Alternative C. Alternative B, with its high prairie dog population, could alter vegetative conditions because of competition for forage between grazing species during drought, and there would be a higher potential for conflicts with neighboring land uses, both of which may represent an adverse impact. Thus, it would not achieve criteria 3 or 5 as well as Alternative C. Alternative D's low prairie dog population could only be achieved with a substantial reduction of the existing prairie dog population. Whether this reduction was accomplished with lethal or non-lethal means, the reduction may represent an adverse impact to a natural resource that the National Park Service is charged with preserving. Additionally, the prairie dog population associated with Alternative D would have a reduced ecological role and have a reduced ability to support other species utilizing that habitat.

Based on the reasons presented above, Alternative C would be the environmentally preferred alternative. Factors and reasons supporting these conclusions are included in the specific impact topic analyses presented in the "Affected Environment and Environmental Consequences" section.

COMPARISON OF ALTERNATIVES

Table 3 presents the ability of the alternatives to meet the project objectives. This provides a way to quickly compare and contrast the degree to which each alternative accomplishes the purpose or fulfills the need identified in the "Purpose and Need" section. The discussion of reasons and considerations supporting these summary findings is presented in the specific impact topic analyses presented in the "Affected Environment and Environmental Consequences" section.

TABLE 3. OBJECTIVES AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM

Objective	Alternative A, the No Action Alternative	Alternative B	Alternative C	Alternative D
Establish and maintain a black-tailed prairie dog population within the park that achieves a sustained minimum population size and distribution that is sufficient to fulfill the ecological keystone role of the species.	The prairie dog population in the park is currently at a sustainable size and distribution. Therefore, this objective would be met.	The large prairie dog population would be maintained at a sustainable size and distribution. Therefore, this objective would be met.	The moderate prairie dog population would be maintained at a sustainable size and distribution. Therefore, this objective would be met.	The low prairie dog population would put the prairie dog population at potential risk of becoming unsustainable. Therefore, this objective would not be met.
Define and map all prairie dog complexes associated with Wind Cave National Park.	This objective would be met by continuing current management.	This objective would be met through ongoing monitoring activities by park staff.	Same as Alternative B.	Same as Alternative B.
Establish the appropriate target prairie dog population levels consistent with other long-term resource conditions in the park.	Currently, prairie dog population levels are functioning well with other resources, but the unregulated prairie dog population has the potential to expand or contract. As a result, this objective may or may not be met depending on unknown future conditions.	In conjunction with ungulate management plans currently in preparation, available forage would be adequate for all grazing species despite the high prairie dog population that would be maintained in this alternative. Overall plant diversity would be maintained. Therefore, this objective would be met.	In conjunction with ungulate management plans currently in preparation, available forage would be adequate for all grazing species. Overall plant diversity would be maintained. Therefore, this objective would be met.	In conjunction with ungulate management plans currently in preparation, available forage would be adequate for all grazing species. Overall plant diversity would be maintained. Therefore, this objective would be met.
Conserve the regional biodiversity, especially opportunities for conserving and restoring rare species.	Support for regional biodiversity and rare species that rely on prairie dog complexes, such as burrowing owls, black-footed ferrets, and horned larks, would be	Regional biodiversity would be conserved because the high prairie dog acreages would be adequate to support a sustainable reintroduced black-footed ferret	Similar to Alternative B, although the lower end of the range would not have the same opportunity because 1,000 acres of prairie dogs may be too few to support a black-footed	Regional biodiversity would not be conserved because the low prairie dog acreages would not likely be adequate to support commensal species relying upon prairie dog

TABLE 3. OBJECTIVES AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM

Objective	Alternative A, the No Action Alternative	Alternative B	Alternative C	Alternative D
	uncertain because of the unregulated nature of the prairie dog complexes. Restoration of a black-footed ferret population would be dependent on implementation of a prairie dog management plan that helps to ensure the long-term viability of the prairie dog population. The long-term viability of the existing unregulated prairie dog population is uncertain under existing conditions, and allocation of ferrets for a reintroduction by the U.S. Fish and Wildlife Service would be unlikely.	population and to support species relying upon prairie dog complexes, such as burrowing owls and horned larks. Therefore, this objective would be met.	ferret reintroduction .	complexes, such as burrowing owls and horned larks, nor would it likely be sufficient to sustain a reintroduced black-footed ferret population. This objective would not be met.
Establish management zones for prairie dogs within the park based upon existing colonies, neighboring land uses, and suitable habitat, while maintaining native plant communities and plant diversity.	No new management zones would be created. This objective would not be met.	Both a No Prairie Dog Zone and Active Management Zone would be implemented in the park. Therefore, this objective would be met.	A No Prairie Dog Zone would be implemented in the park. Management treatment would stem from neighboring concerns. Therefore, this objective would be met.	A No Prairie Dog Zone would be implemented in the park. Colonies only in the interior of the park would minimize neighboring concerns. Therefore, this objective would be met.

TABLE 3. OBJECTIVES AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM

Objective	Alternative A, the No Action Alternative	Alternative B	Alternative C	Alternative D
Protect ethnographic and other cultural resources associated with prairie dog colonies.	The unregulated prairie dog population has the potential to increase and adversely affect other grazing species, such as bison, or elk that are culturally valued. Thus, this objective may or may not be met, depending on unknown future conditions.	This objective would provide the highest acreage of habitat for burrowing owls, eagles, bison, and other culturally valued species that depend upon prairie dogs and therefore this objective would be met, although other culturally valued species (e.g., elk) could be adversely affected.	This objective would be met by achieving the best possible ecological balance among populations of prairie dogs, species such as raptors, and grazing animals such as bison.	Decreased numbers of prairie dogs would have an adverse impact on burrowing owls, eagles, bison, and other culturally valued species that depend upon prairie dogs. This objective would not be fully met.
Continue monitoring prairie dog populations to ensure that prairie dog management actions are maintaining long-term viable populations and that management objectives are being met.	Monitoring of prairie dog populations would continue under current management. However, because current management guidelines under the 1982 prairie dog management plan are not achievable, this objective cannot be achieved under Alt A.	Monitoring would be conducted to determine the acreage used by prairie dogs and potentially the size of the population. Therefore, this objective would be met.	Same as Alternative B.	Same as Alternative B.
Identify potential methods that can be used to control prairie dog populations if control is needed.	The park would continue to relocate prairie dog colonies away from developed areas. Because the park would continue to reject lethal control methods, this objective would not be fully met.	Implementation of this alternative would include a suite of lethal, non-lethal, and habitat management tools for use in controlling the prairie dog population and their colonization. Therefore, this objective would be met.	Same as Alternative B.	Same as Alternative B.

TABLE 3. OBJECTIVES AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM

Objective	Alternative A, the No Action Alternative	Alternative B	Alternative C	Alternative D
Develop a contingency plan for disease outbreaks in prairie dog populations.	No specific contingency plan would be developed for use in the event of an outbreak of sylvatic plague, however, the park would implement Center for Disease Control guidelines in the event of an outbreak. Therefore, this objective would not be met.	A contingency plan to address a sylvatic plague epizootic would be developed by Wind Cave National Park. The contingency plan would be developed in consultation with the USFWS, and NEPA compliance would be performed separately. Therefore, this objective would be met.	Same as Alternative B.	Same as Alternative B.
Implement actions that recognize the public / neighbor interface (the boundary area) and the need to foster a “good neighbor” policy.	Actions taken to address prairie dog issues on adjacent lands would be minimal. This objective would not be fully met.	The creation and implementation of the Active Management Zone would minimize the prairie dog population from moving onto adjacent lands. Park staff would also meet with landowners to assess their goals for prairie dog management. Therefore, this objective would be met.	Monitoring and appropriate management actions would take place to help minimize or reduce prairie dog emigration and dispersal out of the park, as substantiated on a case-by-case basis. Therefore, the alternative would meet this objective.	The large reductions in the prairie dog population associated with this alternative would likely reduce concerns that neighbors would have about prairie dogs coming on to their lands. Therefore, this objective would be met.

SUMMARY OF IMPACTS

Table 4 summarizes the effects of each resource management approach on the impact topics that were retained for analysis at Wind Cave National Park. More detailed information on the effects of the management approaches is provided in the “Affected Environment and Environmental Consequences” section.

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
Wildlife and habitats	<p>Continued presence of the prairie dog population in Wind Cave National Park would have a long-term, minor to moderate benefit to the prairie dog population and the other wildlife species associated with and dependent on the habitat created by the prairie dog.</p> <p>There would be long-term, minor, adverse effects as a result of competition with ungulate species for the limited forage resource.</p> <p>If prairie dog populations within the park declined dramatically, or a stochastic event occurred, there would be a long-term, minor to moderate adverse effect on prairie dogs or wildlife species dependent upon them.</p> <p>Alternative A would not result in impairment of wildlife resources.</p>	<p>The prairie dog population in the park would experience a long-term, moderate benefit. Wildlife species dependent on prairie dogs and the habitats they create would accrue this same benefit, because their habitat would increase as prairie dog populations increase.</p> <p>The effects of a substantially increased prairie dog population would heighten the competition for forage with other grazers, particularly in years with below normal precipitation, causing long-term, minor to moderate, adverse effects to ungulates. While zinc phosphide could potentially affect other wildlife species, because of the infrequency of use, the effect to wildlife and habitats would be short-term, negligible, and adverse.</p> <p>Alternative B would not result in impairment of wildlife resources.</p>	<p>This alternative would allow the prairie dog to fulfill its keystone species role in the mixed-grass prairie communities of the park. Wildlife species dependent on prairie dogs and the habitats they create would experience a long-term, minor to moderate benefit under this alternative. Effects to other grazers would be less than Alternative B, and the impacts would be characterized as long-term, negligible to minor, and adverse. Because zinc phosphide could potentially affect other wildlife species, even though its use would be limited, the effect to wildlife and habitats would be short-term, negligible to minor, and adverse under Alternative C.</p> <p>Alternative C would not result in impairment of wildlife resources.</p>	<p>Alternative D would have a long-term, moderate adverse effect on the prairie dog, and the effect on wildlife species that are associated with the prairie dog and its habitat would be moderate, long-term, and adverse because the prairie dog's keystone role would become diminished. Under this alternative, the effects to ungulate species and their forage would be adverse and negligible, because the higher nutrition forage in prairie dog colonies would be substantially reduced. Effects from zinc phosphide would be short-term (from a population perspective), minor, and adverse to other wildlife species that are associated with prairie dog colonies.</p> <p>Alternative D would not result in impairment of wildlife resources.</p>

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
Vegetation	<p>Effects to vegetation under the No Action Alternative would be long-term, minor to moderate, and beneficial from vegetation changes in and near prairie dog colonies that would increase the diversity of vegetative communities in the park. Because of potential expansion of prairie dogs and continued mowing efforts in prairie dog towns, effects of prairie dog expansion affecting exotic vegetation would have long-term, negligible, adverse effects on vegetation. Mowing would also have a short-term, minor, adverse effect on vegetation structure. If prairie dog colonies declined in the park, the associated exotic species would decline, resulting in a long-term, minor beneficial effect.</p> <p>Alternative A would not result in impairment of vegetation resources or values.</p>	<p>Effects of prairie dog expansion under Alternative B would have a long-term, minor to moderate, beneficial effect on vegetation in the park by increasing the diversity of vegetative communities within the park. The intensity would be dependent upon precipitation's role in colony expansion. Continued mowing in and around prairie dog colonies would have a long-term, minor, beneficial effect on vegetation, as it would minimize the expansion of non-native species, such as thistle. Mowing prairie dog colonies and prairie to expand prairie dog habitats would have a short-term, minor, adverse effect on vegetation structure and a long-term, minor, beneficial effect on vegetation by reducing the expansion of non-native species.</p> <p>Alternative B would not result in impairment of vegetation resources or values.</p>	<p>Under Alternative C, prairie dogs would play an important role in ecosystem regulation and maintenance of a diversity of vegetative communities, which would result in long-term, minor to moderate, beneficial effects on vegetation. Continued mowing in and around prairie dog colonies would have a long-term, minor, beneficial effect on vegetation, as it would reduce the expansion of non-native species, such as thistle. Mowing prairie dog colonies and to expand prairie dog habitats would have a short-term, minor, adverse effect on vegetation structure.</p> <p>Alternative C would not result in impairment of vegetation resources or values.</p>	<p>Under Alternative D, the prairie dog's role in ecosystem regulation would be reduced, a long-term, minor to moderate, adverse effect. Mowing would continue in prairie dog colonies to reduce the expansion of thistle and other non-native species, resulting in long-term, minor, beneficial effects to vegetation.</p> <p>Alternative D would not result in impairment of vegetation resources or values.</p>

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
Endangered and threatened species	<p>There would be no effect to endangered and threatened species by continuing current management activities because no endangered and threatened species currently are likely to be present in areas where black-tailed prairie dog management activities would occur, and the actions that are likely to be taken would not affect any transient sensitive species under the No Action Alternative. However, if the black-footed ferret were to be reintroduced, the No Action Alternative would result in a long-term, moderate, beneficial effect. Alternative A would likely affect, but not likely adversely affect the black-footed ferret. There would be no effect to the bald eagle.</p> <p>Alternative A would not result in impairment of endangered and threatened species.</p>	<p>There would be a potential long-term, moderate beneficial effect (may affect, but not likely to adversely affect) on the black-footed ferret if prairie dog acreage and prairie dog population management were sufficient to support a ferret reintroduction. Alternative B would likely affect, but not likely adversely affect, the black-footed ferret, if it were reintroduced, and bald eagles that use the habitats in the park.</p> <p>Alternative B would not result in impairment of endangered and threatened species.</p>	<p>There would be a potential long-term, moderate, beneficial effect on the black-footed ferret if prairie dog colony acreage were sufficient to support a ferret reintroduction. Alternative C would affect, but not likely adversely affect, listed threatened or endangered species in the park.</p> <p>Alternative C would not result in impairment of endangered and threatened species.</p>	<p>Alternative D would affect, but not likely adversely affect, federally listed endangered and threatened species in Wind Cave National Park, in particular the black-footed ferret, as there would not be acreage sufficient to support a reintroduction.</p> <p>Alternative D would not result in impairment of endangered and threatened species.</p>

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
Socioeconomics	Under Alternative A, prairie dog populations would likely continue to cross between the park and private land, which could lead to long-term, negligible to minor, adverse effects to socioeconomics due to the loss of forage for livestock. However, the continued presence of the prairie dog as a park attraction for wildlife-viewing visitors would create a long-term, negligible benefit to socioeconomics.	Alternative B would produce long-term, negligible to minor benefits to socioeconomics, resulting from the reduced financial strain from funding prairie dog management that would result from the use of an Active Management Zone and the potential tax benefits or compensation associated with the use of landowner incentives or conservation easements (implemented by outside entities). The high numbers of visible prairie dogs would maintain wildlife viewing opportunities, creating a long-term, negligible benefit to socioeconomics.	The prairie dog population that would result under Alternative C would be subject to population control on a case-by-case basis in the park, and would create long-term, negligible, beneficial effects to socioeconomics. The use of landowner incentives or conservation easements and maintenance of wildlife viewing opportunities could produce long-term, negligible benefits to socioeconomics.	The low population of prairie dogs in the park would decrease the socioeconomic effects of encroachment onto private land and produce a long-term, minor, beneficial effect to socioeconomics. The potential use of incentives and easements for landowners, to create prairie dog habitat, could result in long-term, negligible, beneficial effects. The reduced number of visible prairie dogs may ultimately affect visitation although this potential adverse effect would be negligible.
Ethnographic resources	Continuation of existing conditions would have long-term, negligible, adverse effects on other ethnographically valued wildlife species such as elk that compete for forage resources, especially during periods of drought. Conversely, Alternative A would have a minor benefit on species dependent on the prairie dog and its habitats,	Alternative B would have long-term, beneficial minor effects and long-term, adverse negligible to moderate effects on ethnographic resources valued by tribes. Alternative B would not result in impairment of ethnographic resources.	Beneficial effects of Alternative C on ethnographic resources would be long term and moderate because the potential for a reintroduced population of black-footed ferret would exist, regrowth of native vegetation considered ethnographically important would be supported, and wildlife species who depend on prairie dogs and the habitats they create would benefit. Effects to bison and	Implementation of Alternative D would have a long-term, negligible, adverse effect on ethnographic resources because reduced prairie dog populations would affect ethnographically valued plant and animal species that are dependent upon them, and decrease the amount of soil tilling and fertilization that, over the long term, would benefit bison, a species that is highly valued by American

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
	including benefits to native plants. Thus this alternative would have both beneficial (minor to moderate) and adverse (negligible) impacts on ethnographically valued resources. Alternative A would not result in impairment of ethnographic resources.		elk would be long term, negligible to minor, and adverse due to competition for forage. Alternative C would not result in impairment of ethnographic resources.	Indians. Alternative D would not result in impairment of ethnographic resources.
Park operations	Prairie dog management activities and time responding to landowner concerns about prairie dogs as a result of continuing current management would result in a long-term, negligible to minor, adverse effect on park operations.	Because of the increased need for control in the Active Management Zone and activities needed to encourage prairie dog colony expansion, Alternative B would have a long-term, minor to moderate, adverse effect on park operations.	The effects of Alternative C would be similar to those of the No Action Alternative, with the exception of additional management tools, which would require additional staff time. Effects of Alternative C would be long-term, negligible to minor, and adverse.	Because Alternative D would involve a large amount of staff time for extensive prairie dog control efforts, even though there would be less time needed to respond to landowner complaints, effects on park operations would be long term, moderate, and adverse.
Visitor use and experience	Continuing to ensure the ease of viewing prairie dogs and their activities would result in short-term, negligible benefits to visitor use and experience.	The increased population of prairie dogs would enhance wildlife-viewing opportunities for park visitors and would result in long-term, minor to moderate, beneficial effects on visitor use and experience. The effects of various population control activities on the visitor experience could be adverse, short-term, and negligible to minor.	Effects on the visitor experience resulting from population control activities would be short-term, negligible to minor, and adverse. Wildlife-viewing opportunities would be similar to those under the No Action Alternative and would produce long-term, minor, beneficial effects on visitor use and experience.	The use of lethal control, and the reduced population of prairie dogs in the park would produce long-term, minor to moderate adverse effects on visitor use and experience, due to the reduced visibility of a desired wildlife-viewing resource, the potential negative visitor reaction to witnessing population control methods, and potential access restrictions during control actions.

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
Public health and safety	Alternative A would continue to have long-term, negligible, beneficial effects and long-term, negligible, adverse effects on public health and safety. Beneficial effects would continue to occur from continuing to relocate prairie dogs away from areas where they may pose health and safety risks. Adverse effects would result from the continued potential for injuries from park staff working in outdoor field conditions while implementing prairie dog management activities.	Alternative B would have long-term, minor, beneficial effects from implementing prairie dog management activities in areas where they may pose health and safety risks. This alternative would also have long-term, negligible, adverse effects on public health and safety. These effects would result from the continued potential for injuries from park staff working in outdoor field conditions while implementing prairie dog management activities. Long-term, negligible, adverse effects would also be present due to the potential for use of lethal population-reducing tools.	Alternative C would have long-term, minor, beneficial effects from implementing prairie dog management activities in a defined zone. This alternative would also have long-term, minor, adverse effects on public health and safety. These effects would result from the continued potential for injuries from park staff working in outdoor field conditions and the potential for use of rodenticide and shooting as population-reducing tools.	Alternative D would have long-term, minor, beneficial effects, from implementing prairie dog management activities in a defined zone, and long-term, negligible, adverse effects from the continued potential for injuries from park staff working in outdoor field conditions. There would also be long-term, minor to moderate, adverse effects from the use of rodenticide and shooting as population-reducing tools.
Soils	There would continue to be long-term, negligible to minor, beneficial effects to soil resources as the prairie dog would continue its role as an agent in soil mixing, formation, and enhancement, and erosion control. Alternative A would not result in impairment of soil resources or values.	There would be long-term negligible to minor, benefits to soil resources felt over a wider area where prairie dog colony expansion has occurred. Short-term, adverse effects from the use of zinc phosphide would be negligible. Alternative B would not result in impairment of soil resources or values.	Alternative C would have a long-term, negligible to minor, beneficial effect to soil resources. Short-term, adverse effects from the use of zinc phosphide would be negligible. Alternative C would not result in impairment of soil resources or values.	Alternative D would have long-term, negligible to minor, beneficial effects to soil resources even though the role of the prairie dog would be reduced. Short-term, adverse effects from the use of zinc phosphide would be negligible. Alternative D would not result in impairment of soil resources or values.

TABLE 4. SUMMARY OF EFFECTS BY IMPACT TOPIC

Impact Topic	Alternative A, the No Action Alternative	Alternative B – High Acreage Target	Alternative C – Mid-range Acreage Target, the Preferred Alternative	Alternative D- Low Acreage Target
Water resources	<p>The No Action Alternative would have long-term, negligible, beneficial effects to water resources as a result of burrowing activities, loosening soil, and allowing more water to infiltrate instead of delivering runoff to streams.</p> <p>Alternative A would not result in impairment of park water resources or values.</p>	<p>Alternative B would have long-term, negligible, beneficial effects to water resources as a result of burrowing activities and increased infiltration of runoff. The use of the rodenticide zinc phosphide would have short-term, negligible, adverse effects on water resources.</p> <p>Alternative B would not result in impairment of park water resources or values.</p>	<p>Alternative C would have effects similar to, but of a slightly lower intensity than Alternative B because of the reduced area of prairie dog colonies. Short-term, negligible, adverse effects would result from the use of zinc phosphide.</p> <p>Alternative C would not result in impairment of park water resources or values.</p>	<p>Alternative D would have long-term, negligible, beneficial effects to water resources as a result of burrowing activities. Effects associated the use of zinc phosphide would be similar to those described for Alternative C.</p> <p>Alternative D would not result in impairment of park water resources or values.</p>

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section describes the evaluation methods, the affected environment, and the environmental consequences associated with the prairie dog population management approaches. It is organized by impact topic, which allows a standardized comparison between alternatives based on issues. Consistent with NEPA, the analysis also considers the context, intensity, and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate impacts. National Park Service policy also requires that “impairment” of resources be evaluated in all environmental documents associated with resource analysis.

METHODOLOGY

General Evaluation Methodology

For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of the effects of implementing each alternative. The impact analyses were based on information provided by park staff, relevant references and technical literature citations, and subject matter experts. The impact analyses involved the following steps:

- Define issues of concern, based on internal and public scoping.
- Identify the geographic area that could be affected.
- Define the resources within that area that could be affected.
- Impose the action on the resources within the area of potential effect.
- Identify the effects caused by the action alternatives, in comparison to the baseline represented by the No Action Alternative, to determine the relative change in resource conditions.
- Characterize the effects based on the following factors:
 - Whether the effect would be beneficial or adverse,
 - Intensity of the effect: negligible, minor, moderate, or major. (Impact-topic-specific thresholds for each of these classifications are provided in Table 5.) Threshold values were developed based on federal and state standards, consultation with regulators, and discussions with subject matter experts,
 - Duration of the effect: short-term or long-term, with specificity for each impact topic,

- Context or area affected by the proposed action: site-specific, local, parkwide, regional, and
- Whether the effect would be a direct result of the action or would occur indirectly because of a change to another resource or impact topic. An example of an indirect impact would be increased mortality of an aquatic species that would occur because an alternative would increase soil erosion, which would reduce water quality.

Methodology for Assessing Impacts on Cultural Resources

Potential Effects to Cultural Resources and Section 106 of the National Historic Preservation Act.

Attention to the peoples whose lifeways are traditionally associated with resources under National Park Service stewardship is mandated in legislation and NPS policies. In this environmental assessment, effects to ethnographic resources and concerns are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement NEPA.

Typically these impact analyses also are intended to comply with the requirements of Section 106 of the National Historic Preservation Act (NHPA) and would analyze effects on traditional cultural properties. However, no traditional cultural properties have been formally defined for Wind Cave National Park, so the discussion will focus on ethnographic resources and concerns. Impacts to these resources are described using NEPA terminology (above). Impact threshold definitions for assessing potential effects on these resources is included in Table 5, below.

In considering the duration of effects on cultural resources, the effects on ethnographic resources would be both long-term and short-term.

Cumulative Effects

The Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act requires an assessment of cumulative effects in the decision-making process for federal projects. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects are considered for both the no action and action alternatives. The cumulative impacts analysis is presented at the end of each impact topic analysis.

Cumulative effects were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions in the vicinity. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions within Wind Cave National Park and the region. These identified projects and plans are presented under "Related Projects, Plans, and Policies" in the "Purpose and Need" section.

Impairment of Park Resources or Values

NPS *Management Policies 2001* (NPS 2000a) provides guidance on addressing impairment of park resources. Impairment is an impact that, “in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including those that would otherwise be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources that would be affected, the severity, duration, and timing of the impact, the direct and indirect effects of the impact, and the cumulative effects of the impact in question with other impacts.”

Any park resource can be impaired, but an impact would be more likely to result in impairment if it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park,
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- Identified as a goal in the park’s general management plan or other relevant National Park Service planning documents.

An impact would be less likely to result in impairment if it is an unavoidable result, which cannot reasonably be mitigated, of an action necessary to preserve or restore the integrity of vital park resources.

Socioeconomics, park operations, visitor use and experience, and public health and safety are not considered park resources for which Wind Cave National Park was established to protect. Therefore, impairment findings are not included as part of the impact analysis for these topics.

TABLE 5. IMPACT TOPIC THRESHOLD DEFINITIONS

Impact Topic	Negligible	Minor	Moderate	Major	Duration
Wildlife	Wildlife and their habitats would not be affected or the effects would be at or below the level of detection and would not be measurable or of perceptible consequence to wildlife populations.	Effects on wildlife or habitats would be measurable or perceptible, but localized within a small area. While the mortality of individual animals might occur, the viability of wildlife populations would not be affected and the community, if left alone, would recover.	A change in wildlife populations or habitats would occur over a relatively large area within the park. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of population. Mitigation measures would be necessary to offset adverse effects, and would likely be successful.	Effects on wildlife populations or habitats would be readily apparent, and would substantially change wildlife populations over a large area in and out of the national park. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured.	Short-term – Recovers in less than one year. Long-term – Takes more than one year to recover.
Vegetation	Individual native plants may be affected, but measurable or perceptible changes in plant community size, integrity, or continuity would not occur.	Effects on native plants would be measurable or perceptible, but would be localized within a small area. The viability of the plant community would not be affected and the community, if left alone, would recover.	A change would occur to the native plant community over a relatively large area that would be readily measurable in terms of abundance, distribution, quantity, or quality. Mitigation measures to offset or minimize adverse effects would be necessary and would likely be successful.	Effects on native plant communities would be readily apparent, and would substantially change vegetative community types over a large area. Extensive mitigation would be necessary to offset adverse effects and their success would not be assured.	Short-term –Recovery would take less than three years. Long-term – Recovery would take more than three years.
Endangered and threatened species (including federally and state-listed species) (Text in italics used per	<i>No effect:</i> Listed species or designated critical habitat would not be affected.	<i>May affect / Not likely to adversely affect:</i> Effects on listed species or critical habitat would be discountable (<i>i.e.</i> , adverse effects are unlikely to occur or could not be meaningfully measured, detected, or evaluated) or	<i>May affect / Likely to adversely affect:</i> Adverse effects to a listed species or critical habitat might occur as a direct or indirect result of the proposed action and the effect would either not be discountable or completely beneficial. Moderate effects to listed species would result in a local population decline due to	<i>Likely to jeopardize the continued existence of a species / Adversely modify critical habitat:</i> Effects could jeopardize the continued existence of a listed species or adversely modify designated critical habitat within and/or outside the park boundaries. Major	<i>Plants</i> Short-term – Recovers in less than one year. Long-term – Takes more than one year to recover. <i>Animals</i>

TABLE 5. IMPACT TOPIC THRESHOLD DEFINITIONS

Impact Topic	Negligible	Minor	Moderate	Major	Duration
USFWS ESA Section 7 guidance.)		completely beneficial.	reduced survivorship, declines in population, and/or a shift in the distribution; no direct casualty or mortality would occur.	effects would involve a disruption of habitat and breeding grounds of a protected species such that direct casualty or mortality would result in removal of individuals of a listed species from the population.	Short-term – Recovers in less than one year. Long-term – Takes more than one year to recover.
Socioeconomics	No effects would occur or the effects to socioeconomic conditions would be below or at the level of detection.	The effects to socioeconomic conditions would be detectable. Any effects would be small and if mitigation is needed to offset potential adverse effects, it would be simple and successful.	The effects to socioeconomic conditions would be readily apparent. Any effects would result in changes to socioeconomic conditions on a local scale. If mitigation is needed to offset potential adverse effects, it could be extensive, but would likely be successful.	The effects to socioeconomic conditions would be readily apparent and would cause substantial changes to socioeconomic conditions in the region. Mitigation measures to offset potential adverse effects would be extensive and their success could not be guaranteed.	Short-term – Effects of prairie dog management activities persist less than one year. Long-term – Effects of prairie dog management activities persist more than one year.
Ethnographic Resources	Impact is barely perceptible and would alter neither resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of beliefs and practices. There would be no change to a group's	Adverse impact – impact is slight but noticeable. It does not appreciably alter resource conditions, such as traditional access or site preservation, or the relationship between the resource and the affiliated group's body of beliefs and practices. Beneficial impact – impact enhances traditional access	Adverse impact – impact is apparent and alters resource conditions. Interference occurs with traditional access, site preservation, or the relationship between the resource and the affiliated group's beliefs and practices, even though the group's beliefs and practices would survive. Beneficial impact – a group's beliefs and practices are	Adverse impact – impact alters resource conditions. Traditional access, site preservation, or the relationship between the resource and the affiliated group's body of beliefs and practices are blocked or greatly affected, to the extent that the survival of a group's beliefs and/or practices would be jeopardized.	Effects on some ethnographic features such as archeological sites would be long-term because cultural resources are non-renewable. Effects on vegetation and other renewable ethnographic resources would be short-term (vegetation could be regenerated, etc.).

TABLE 5. IMPACT TOPIC THRESHOLD DEFINITIONS

Impact Topic	Negligible	Minor	Moderate	Major	Duration
	body of beliefs and practices.	and/or accommodates a group's traditional practices or beliefs.	facilitated. For purposes of Section 106, the determination of effect on ethnographic resources would be no adverse effect.	Beneficial impact – a group's beliefs or practices are encouraged.	
Park operations	Park operations would not be affected or the effect would be at or below levels of detection, and would not have an appreciable effect on park operations.	The effect would be detectable but would not be of a magnitude that it would appreciably change the park. If mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.	The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, and their success would not be assured.	Short-term – Occurs only during the duration of the project. Long-term – Persists beyond the duration of the project.
Visitor use and experience	Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.	Changes in visitor use and/or experience would be detectable. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Changes in visitor use and/or experience would be readily apparent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.	Changes in visitor use and/or experience would be readily apparent and have important consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	Short-term – Occurs only during the treatment action. Long-term – Occurs after the treatment action.
Public health and safety	Public health and safety would not be affected, or the effects would be at low levels	The effect would be detectable, but would not have an appreciable effect on public health and safety.	The effect would be readily apparent, and would result in substantial, noticeable effects on public health and safety on a	The effects would be readily apparent, and would result in substantial, noticeable effects on public health and	Short-term – Occurs only during the duration of the project.

TABLE 5. IMPACT TOPIC THRESHOLD DEFINITIONS

Impact Topic	Negligible	Minor	Moderate	Major	Duration
	of detection and would not have an appreciable effect on the public health or safety.	If mitigation were needed, it would be relatively simple and likely successful.	local scale. Changes in rates of accidents or injuries could be measured. Mitigation measures would probably be necessary and would likely be successful.	safety on a regional scale. Changes could lead to changes in the rate of mortality. Extensive mitigation measures would be needed, and their success would not be assured.	Long-term – Persists beyond the duration of the project.
Soils	Soils would not be affected or the effects on soils would be below or at levels of detection. Any effects on soil productivity or fertility would be slight and would return to normal shortly after completion of project activities.	The effects on soils would be detectable, but effects on soil productivity or fertility would be small. If mitigation was needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.	The effect on soil productivity or fertility would be readily apparent and would result in a change to the soil character over a relatively wide area.	The effect on soil productivity or fertility would be readily apparent and would substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be needed, and their success would not be assured.	Short-term – Following completion of the project, recovery would take less than one year. Long-term – Following completion of the project, recovery would take more than one year.
Water resources	Effects would not be detectable. Water quality parameters would be well within all water quality standards for the designated use of the water. Water quality would be within historical conditions.	Effects would be measurable, but water quality parameters would be well within all water quality standards for the designated use. Water quality would be within the range of historical conditions.	Changes in water quality would be readily apparent, but water quality parameters would be within all water quality standards for the designated use. Water quality would be outside historic baseline on a limited basis. Mitigation would be necessary to offset adverse effects, and would likely be successful.	Changes in water quality would be readily measurable, and some quality parameters would periodically be exceeded. Extensive mitigation measures would be necessary and their success would not be assured.	Short-term – Recovery would take less than one year. Long-term – Recovery would take more than one year.

WILDLIFE

Affected Environment

The wildlife habitat within Wind Cave National Park is a mosaic of mixed-grass prairie, shrublands, riparian areas, woody draws, and coniferous forests. This mixture of prairie and forest ecosystems supports a variety of wildlife. Over 50 mammal species and more than 200 avian species have been reported in the park (NPSpecies Database 2005). Large mammals commonly viewed in the park include bison, elk, mule deer, white-tailed deer, and pronghorn. The park maintains the bison and elk herds at conservative levels to avoid resource degradation by overgrazing. The 2005 draft Bison Management Plan and Environmental Assessment (note that this plan is in preparation and population sizes associated with the plan at this time are subject to change depending on the final plan and management decision) and the park's elk management plan and environmental assessment from the 1980's strive for 350-400 animals each (NPS 2005b, NPS 1980). Surplus animals have been managed under the park's 1938 Surplus Wildlife Disposal Act, but with the discovery of chronic wasting disease in elk using the park, a new elk management plan is being developed to manage the elk population.

Black-tailed prairie dog

The black-tailed prairie dog is the most abundant and widely distributed prairie dog species (USFWS 1999). The best known information indicates that the species has been present in the vicinity for thousands of years (Carlson 1986, White 1986). Wind Cave National Park currently has about 2,200 acres of prairie dog colonies distributed throughout the park in 16 colonies or locations. The species is thriving. The park has approximately 8,566 acres of potential habitat (Muenchau pers. comm. 2005a). Current park management provides for no population control, thus allowing natural expansion of prairie dog towns (Muenchau pers. comm. 2002).

The largest single prairie dog colony in the park extends along both sides of Highway 385 for a distance of almost one mile, just south of the south access road to the visitor center. This colony occupies 746 acres (see Figure 3) and is home to thousands of prairie dogs. This site provides wildlife viewing of the prairie dogs and their predators in the park, including coyotes and raptors. The animals that reside here frequently cross the highway and are occasionally killed by passing vehicles.

The coyote is a primary prairie dog predator, with raptors, badger, and bobcat (*Felis rufus*) also preying on prairie dogs (NPS 1994a). In recent years, mountain lion (*Felis concolor*) sightings have increased in the park, supporting the likelihood that a lion population has established itself in the area (Roddy pers. comm. 2002), although prairie dogs would not contribute substantially to the lion's diet.

Grasses comprise up to 80 percent or more of the black-tailed prairie dog's diet in northern mixed-grass prairie, especially in spring and summer (Detling in Hoogland, 2005). Preferred grasses include big bluestem, little bluestem, grama (*Bouteloua species*), buffalo grass, western wheatgrass, and sedges (*Carex species*). During the fall, broadleaf plants are especially important; any available vegetation could be eaten in winter. Repeated clipping by prairie dogs

favors a plant community of forbs, perennials, and shortgrass species more resistant to constant grazing.

The black-tailed prairie dog is regarded as a keystone species by many researchers because a number of wildlife species depend on prairie dogs and/or the unique habitat they create (Kotliar in Hoogland, 2005). A keystone species is one whose ecological effect is disproportionate to its abundance; a decline in a keystone species' population initiates changes in ecosystem structure and a decline in overall species diversity (USFWS 2000). According to the U.S. Fish and Wildlife Service's Twelve Month Administrative Finding for Black-tailed Prairie Dogs (USFWS 2000), at least "9 species depend directly on prairie dogs or their activities to some extent, and another 137 species are associated opportunistically." These include birds, ungulates, small mammals, and reptiles. Burrowing owls nest in seldom used or abandoned prairie dog tunnels. Mountain plover (*Charadrius montanus*) prefer the mosaic of bare-ground/shortgrass habitat of prairie dog colonies; ferruginous hawks depend on prairie dogs for food. Black-footed ferrets are almost entirely dependent on prairie dogs as a prey source and also use their tunnels for cover (NRCS 2001).

Black-footed ferrets are one of the rarest animals in the world. Recovery of the species is impeded by lack of reintroduction sites, especially sites free of plague. Wind Cave National Park has never detected plague in its prairie dog population. NPS management policy 4.4.2.3 (NPS 2001) states "the service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act."

Burrowing and foraging activities of black-tailed prairie dogs affect a number of ecosystem processes that, in turn, affect many prairie-dwelling species. These processes and ecosystem characteristics include vegetation structure, plant composition, nutrients in soil, soil turnover, soil chemistry, energy flows, nutrient quality of plants, and plant succulence (USFWS 2004).

Bison, elk, mule deer, and other ungulates have a symbiotic relationship with black-tailed prairie dogs. Ungulates graze on the highly nutritious forage that prairie dogs continuously clip (USFWS 1999). Less dominant prairie dogs follow ungulate game trails as they seek out new areas to colonize (Licht and Sanchez 1993).

Other wildlife

Numerous reptiles and amphibians inhabit the park. Common reptiles include the blue racer (*Coluber constrictor*), wandering garter snake (*Thamnophis elegans*), and prairie rattlesnake (*Crotalus viridis*). Amphibian residents include the blotched tiger salamander (*Ambystoma tigrinum*), Woodhouse's toad (*Bufo woodhousei*), and the Great Plains toad (*Bufo cognatus*) (NPS 1994a).

Many bird species use the park's habitats for residence or migratory use. Wrens (family Troglodytidae), swallows (family Hirundinidae), mourning dove (*Zenaidura macroura*), meadowlark (*Sturnella neglecta*), and mallard (*Anas platyrhynchos*) are commonly sighted. Raptors, including red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and American kestrel (*Falco sparverius*), prey on the many small mammals in the park. Shorebirds, including killdeer (*Charadrius vociferus*) and spotted sandpiper (*Actitis macularia*) frequent the area in summer months. The western tanager (*Piranga ludoviciana*) and mountain bluebird (*Sialia currucoides*) are also sighted in the park during the summer (NPSpecies Database).

Several bat species have been recorded in the park, including the long-eared bat (*Myotis evotis*), small-footed myotis (*Myotis ciliolabrum*), little brown myotis (*Myotis lucifugus*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), big brown bat (*Eptesicus fuscus*), and silver-haired bat (*Lasionycteris noctivagans*). Some of these species use caves for daytime roosts, while others utilize mines, natural formations such as crevices or holes in trees, or buildings for resting (Moore 1996, Turner 1974).

Elk were reintroduced into the park between 1911 and 1916. During the winter of 2005 there were an estimated 850 elk in Wind Cave National Park (Roddy pers. comm. 2005b). An elk management plan is currently being developed, which will determine what elk population level the park will manage for in the future. Preliminary information being developed in association with the elk management plan indicates that the elk population in the park could be substantially reduced.

American bison were reintroduced into the park in 1913. At present, there are approximately 455 bison within the park, including calves (NPS 2004b). Beginning in 2003, the park began experimenting with a biannual culling with the goal of removing approximately 160 animals, which reduced the adult herd size to approximately 300 animals. This culling occurred again in October 2005. A bison management plan is currently in development by the park. From a genetics standpoint, research indicates that to maintain the valuable genetic resource of the herd, the park should strive to manage their numbers at a minimum of 400 animals.

The park's resource management staff has developed a forage allocation model based on Natural Resource Conservation Service (NRCS) protocols. Forage allocation models estimate the amount of forage production and its availability to grazers and allocate this forage subject to various constraints (Rangeland Technical Advisory Council 2001). At Wind Cave National Park, total rangeland vegetation is currently estimated at 36,740 animal unit months (AUMs) (Foster pers. comm. 2005). An AUM is defined as the forage needed to support one cow/calf pair for one month (Ruyle and Ogden 1993).

In the park's forage allocation model, 50 percent of the vegetation produced in a year of average precipitation has been set aside to maintain natural vegetation communities and 25 percent has been allocated to trampling, hail damage and insects. The remaining 25 percent (9,185 AUMs) is allocated as forage for the major forage consumers (*i.e.*, elk and bison). The NRCS protocols adjust for habitat modification by prairie dogs to available forage by lowering overall forage production rates for acres in colony areas. The protocols also do not calculate an AUM for prairie dog consumption, but this is accounted for in the lower production rates (Boltz pers. comm. 2005).

Verification of the forage allocation model has been performed by field measurements of forage produced within the park and comparing these to estimates developed by the NRCS for similar range site types. Although only two years of sampling has taken place, current estimates are closely aligned to predicted estimates developed by the NRCS.

Table 6 presents the current estimated numbers of animals for each species and their corresponding Animal Unit Months (AUMs) using 1.2 as the coefficient for an average adult bison and 0.6 for the average elk at Wind Cave National Park. AUMs can be useful in comparing the total forage one species may use, compared to another species, irrelevant of size or individual numbers. The total AUMs that are currently being used, 9,342 AUMs are above the allocated

9,185 AUMs, which indicates that wildlife forage needs are currently being over-utilized by 157 AUMs during years of average precipitation.

TABLE 6. CURRENT WILDLIFE FORAGE NEEDS AT WIND CAVE NATIONAL PARK

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	330	4,752 330 x 1.2 x 12 months
Elk – Average, Year Round	425	3,060 425 x 0.6 x 12 months
Elk – Average, Winter Only	425	1,530 425 x 0.6 x 6 months
Estimated Total AUMs required		9,342

Current available forage and prairie dog acreage of 2,200 equates to 9,185 AUMs available for the above-mentioned ungulates.

Effects of Alternative A – the No Action Alternative

Continuing the current management program of black-tailed prairie dogs in Wind Cave National Park would continue the current trend of colony expansion if periods of drought continue. Prairie dogs often expand their colonies during drought conditions (USFWS 2000). However, precipitation in the early part of the 2005 growing season has been adequate, and, as a result, prairie dog acreage could stabilize if the drought has ended. If the No Action Alternative were implemented, prairie dog numbers would likely expand under drought conditions and stabilize or potentially shrink during wet periods.

As long as conditions remain stable, the black-tailed prairie dog would continue to maintain its keystone species role in the mixed-grass prairie communities of the park under Alternative A. This would represent a continued minor to moderate benefit for the prairie dog population in the park and provide a long-term, minor to moderate, beneficial effect for wildlife species that are dependent on prairie dogs or associated with the habitats they create, such as the burrowing owl, ferruginous hawk, or horned lark. However, if prairie dog populations within the park declined dramatically, or there was a stochastic event such as a plague epizootic, no actions would be taken by the park to maintain the population or curb the event. With this in mind, the black-tailed prairie dog would not maintain its keystone species role within the park resulting in a long-term, minor to moderate adverse effect for wildlife species that are dependent upon them or their habitat. For an analysis of effects to the black-footed ferret and bald eagle, see the “Endangered and Threatened Species” section.

Continued expansion of prairie dogs in the park has the potential to reduce the forage available to ungulates in the park. The fence around the park creates a somewhat closed ecological system. Bison cannot disperse outside the park to forage, although elk, pronghorn, and deer can move in and out of the park. Elk can jump the fences, but pronghorn and deer are limited to moving through crawl spaces along the fenceline (Muenchau pers. comm. 2005a).

Studies have shown that clipped grasses in and around prairie dog towns are more nutritious than grasses not grazed by prairie dogs. So while prairie dogs may be removing more of the available forage, the remaining forage is more nutritious for other species, which can offset their forage consumption to a degree (Detling in Hoogland, 2005). Under this alternative, the effects to ungulate species and their forage resource would continue to be long term, minor, and adverse, as wildlife forage needs for elk and bison are slightly larger than available forage when accounting for a prairie dog acreage of 2,200 (present conditions).

If the park were to manage elk, bison, or vegetation differently in the future, overall available forage could be altered. The number of elk shown in table 6 and elsewhere in this document are hypothetical and presented for the sake of discussion. The park's elk management plan will make the decision regarding the number of elk that will be supported in the park.

Cumulative effects. The construction associated with the park's highway rehabilitation and wastewater treatment projects would not likely produce long-term effects on wildlife. Proposed wildlife management plans, such as bison and elk, would have a moderate, beneficial, cumulative effect on wildlife in the park. Wildlife management actions outside the park, such as prairie dog control (*i.e.*, lethal removal) on Custer State Park and on adjacent and nearby private lands would likely have a negligible, adverse effect to prairie dog colonies and other wildlife species in the park. Hunting of elk, deer, and pronghorn would reduce competition for forage and in combination with prairie dog reduction efforts outside the park, could result in long-term, minor to moderate benefits to wildlife. Prescribed burns in the park would improve prairie habitat and forage for wildlife, a long-term, minor benefit to wildlife. It is foreseeable that the National Park Service will pursue reintroducing the black-footed ferret to Wind Cave National Park. Although it is not known at this time if the U.S. Fish and Wildlife Service would approve a black-footed ferret reintroduction in the park, if it were to occur, there would be a long-term, minor to moderate beneficial effect on wildlife as a missing piece of the prairie ecosystem would be restored. Other plans and projects would have an overall effect that would be minor, beneficial, and long-term because these plans and projects would enhance natural resources in the park and contribute to sustainable ecosystem processes. The No Action Alternative would make a long-term, negligible, beneficial contribution to these effects. Cumulative effects would therefore be negligible, beneficial, and long term.

Conclusion. The continued presence of the existing prairie dog population in Wind Cave National Park would have long-term, minor to moderate, beneficial effects on other wildlife species that are associated with or dependent upon habitat created by the prairie dog. If prairie dog populations within the park declined dramatically, or there was a stochastic event such as a plague epizootic, the black-tailed prairie dog would not maintain its keystone species role within the park, resulting in a long-term, minor to moderate adverse effect for wildlife species that are dependent upon them or their habitat. There would be long-term, minor adverse effects as a result of competition with ungulate species for the limited forage resource.

Alternative A would not produce major adverse impacts on wildlife resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife resources or values as a result of the implementation of Alternative A.

Effects of Alternative B – High Acreage Target

Alternative B would encourage prairie dog colony expansions from the current approximate 2,200 acres to a target occupied area of 3,000 to 5,000 acres. The prairie dog would maintain its role as a keystone species in the park, and its influence would increase because its habitat would increase. Prairie dog colonies would be allowed to expand by natural processes and by using tools such as mowing of vegetation and trapping and relocating. The increased population would be more widely distributed through the park and the existing small colonies would likely increase, providing them with a higher likelihood of persistence. Population control actions taken in the No Prairie Dog Zone and the Active Management Zone to minimize the potential for dispersal from the park to private lands where they are unwanted would lessen any beneficial effects on the prairie dog population. Overall, Alternative B would have a long-term, moderate benefit on the prairie dog population in the park, as the increased population would have a greater ability to withstand and recover from stochastic events such as prolonged drought.

This alternative would increase the acreage affected by the prairie dog in the mixed-grass prairie communities of the park. Wildlife species dependent on prairie dogs and the habitats they create would experience a long-term, moderate benefit under this alternative, because their habitat would increase as prairie dog populations increase.

With 5,000 acres of prairie dog colonies there would be 8,065 available AUMs. Current ungulate numbers require 9,342 AUMs of forage (as seen in Table 7). This would lead to an over-utilization of 1,277 AUMs.

TABLE 7. WILDLIFE FORAGE NEEDS UNDER PRESENT CONDITIONS FOR ALTERNATIVE B

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	330	4,752
Elk – Average, Year Round	425	3,060
Elk – Average, Winter Only	425	1,530
Total AUMs required		9,342

Available forage and prairie dog acreage of 5,000 equates to 8,065 AUMs available for the above-mentioned ungulates.

However, as demonstrated in Table 8, because the park could reduce elk numbers while increasing bison in the future, the increase in prairie dogs from Alternative B would create small under utilization of forage by wildlife. The maximum prairie dog colony acreage, 5,000, would result in a total of 8,065 AUMs available for ungulates. Proposed ungulate numbers require 7,650 AUMs of forage (as seen in Table 8). This would result in an excess of 415 AUMs of available forage.

TABLE 8. WILDLIFE FORAGE NEEDS AFTER POTENTIAL BISON INCREASE AND ELK REDUCTION UNDER ALTERNATIVE B

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	400	5,760
Elk – Average, Year Round	175	1,260
Elk – Average, Winter Only	175	630
Total AUMs required		7,650

Available forage and prairie dog acreage of 5,000 equates to 8,065 AUMs available for the above mentioned ungulates.

As described in Alternative A, expansion of prairie dog colony acreage in the park has the potential to reduce the forage available to ungulates in the park. The effects of an increased prairie dog population with present wildlife population numbers would heighten the competition for forage with other grazers and decrease the amount of available forage, causing long-term, minor to moderate, adverse effects to ungulates, depending upon the total acreage of the prairie dog population and the ungulate population numbers.

The use of zinc phosphide has the potential to affect wildlife species in addition to the intended target species, the black-tailed prairie dog. In a literature review of toxicants for prairie dog management, the Animal and Plant Health Inspection Service (APHIS) summarized that zinc phosphide is highly toxic to both mammals and some birds (APHIS 2003). Therefore, if non-target species directly consume zinc phosphide or consume animals that have consumed zinc phosphide, the individuals could be at risk of illness or even death. However, secondary toxicity to mammals is low, because zinc phosphide does not significantly accumulate in muscle tissue (EXTOXNET 2005). There is the possibility that lethal controls would be used under this alternative and species not targeted for control could be adversely affected directly. This effect was recently illustrated in a prairie dog control effort taken by state contractors on private land adjacent to Buffalo Gap National Grasslands, north of Badlands National Park, where three horned lark deaths were suspected to be caused by poisons used to control prairie dogs (Miller 2004).

Under Alternative B, zinc phosphide would rarely be used, as the emphasis would be to allow for colony expansion. However, zinc phosphide could be used to control prairie dog populations in

the Active Management and No Prairie Dog Zones. While zinc phosphide could potentially affect other wildlife species, because of the infrequency of use, the effect to wildlife and habitats would be short term, negligible, and adverse.

Cumulative effects. As described for the No Action Alternative, other plans and projects would have an overall effect to wildlife and habitats that would be minor, beneficial, and long-term. Alternative B would make a long-term, minor, beneficial contribution to these effects. Cumulative effects would therefore be long-term, negligible to minor, and beneficial.

Conclusion. The prairie dog population in the park would experience a long-term, moderate benefit. Wildlife species dependent on prairie dogs and the habitats they create would accrue this same benefit, because their habitat would increase as prairie dog populations increase. Mixed-grass prairie dominated by grasses will support more ungulates than mixed-forb prairie. The effects of a substantially increased prairie dog population would heighten the competition for forage with other grazers, particularly in years with below normal precipitation, causing long-term, minor to moderate, adverse effects to ungulates, depending upon the population levels of prairie dogs and ungulates in the park. While zinc phosphide could potentially affect other wildlife species, because of the infrequency of use, the effect to wildlife and habitats would be short term, negligible, and adverse.

Alternative B would not produce major adverse impacts on wildlife resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife resources or values as a result of the implementation of Alternative B.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Alternative C would maintain prairie dog colony acreage in the park between 1,000 and 3,000 acres. This alternative would continue to allow the prairie dog to maintain its keystone species role in the mixed-grass prairie communities of the park. Effects on black-tailed prairie dogs would essentially be the same as under the No Action Alternative; however, population control actions taken in the No Prairie Dog Zone would lessen beneficial effects on the prairie dog population. Overall, Alternative C would have a long-term, minor to moderate benefit on the prairie dog population in the park.

Wildlife species dependent on prairie dogs and the habitats they create would experience a long-term, minor to moderate benefit under this alternative, as their habitat and/or prey source would be maintained.

Similar to Alternatives A and B, maintaining 1,000 and 3,000 acres of prairie dog colonies in the park has the potential to reduce the forage available to ungulates in the park, particularly in years with below normal precipitation. With 3,000 acres of prairie dog colonies there would be 8,865 available AUMs. Current ungulate numbers need 9,342 AUMs of forage (see Table 9). This would result in an over-utilization of 477 AUMs of available forage.

TABLE 9. WILDLIFE FORAGE NEEDS UNDER PRESENT CONDITIONS FOR ALTERNATIVE C – THE PREFERRED ALTERNATIVE

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	330	4,572
Elk – Average, Year Round	425	3,060
Elk – Average, Winter Only	425	1,530
Total AUMs required		9,342

Available forage and prairie dog acreage of 3,000 equates to 8,865 AUMs available for the above mentioned ungulates.

As demonstrated in Table 10, if the park reduces elk numbers, while increasing bison, the population of prairie dogs from Alternative C would not cause an over-utilization of forage for ungulates. The maximum prairie dog colony acreage, 3,000, would result in a total of 8,865 AUMs available for ungulates. Proposed ungulate numbers require 7,650 AUMs of forage (as seen in Table 10). This would result in an under-utilization or excess of 1,215 AUMs of available forage.

TABLE 10. WILDLIFE FORAGE NEEDS AFTER POTENTIAL BISON INCREASE AND ELK REDUCTION UNDER ALTERNATIVE C – THE PREFERRED ALTERNATIVE

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	400	5760
Elk – Average, Year Round	175	1,260
Elk – Average, Winter Only	175	630
Total AUMs required		7,650

Available forage and prairie dog acreage of 3,000 equates to 8,865 AUMs available for the above-mentioned ungulates.

Effects of a prairie dog population ranging from 1,000 to 3,000 acres and current or reduced elk or bison AUMs would result in a range of effects to other ungulates that would be long term, negligible to minor, and adverse in nature.

Under Alternative C, zinc phosphide would be potentially used to maintain the black-tailed prairie dog colonies below 3,000 acres in size. There is the possibility that species not targeted for control could be adversely affected directly. This effect was recently illustrated in a prairie dog control effort taken by state contractors on private land adjacent to Buffalo Gap National Grasslands, north of Badlands National Park, where three horned lark deaths were suspected to be caused by poisons used to control prairie dogs (Miller 2004). Because zinc phosphide could potentially affect other wildlife species, even though its use would be limited, the effect to wildlife and habitats would be short-term, negligible to minor, and adverse under Alternative C.

Cumulative effects. As described under the previous alternatives, other plans and projects would have an overall effect to wildlife and habitats that would be minor, beneficial, and long term. Alternative C would make a long-term, minor to moderate, beneficial contribution to these effects. Cumulative effects would therefore be long term, minor, and beneficial.

Conclusion. This alternative would allow the prairie dog to fulfill its keystone species role in the mixed-grass prairie communities of the park. Wildlife species dependent on prairie dogs and the habitats they create would experience a long-term, minor to moderate benefit under this alternative. Effects to other grazers would be less than Alternative B, and the impacts would be characterized as long-term, negligible to minor, and adverse. Because zinc phosphide could potentially affect other wildlife species, even though its use would be limited, the effect to wildlife and habitats would be short-term, negligible to minor, and adverse under Alternative C.

Alternative C would not produce major adverse impacts on wildlife resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife resources or values as a result of the implementation of Alternative C.

Effects of Alternative D – Low Acreage Target

Alternative D would reduce prairie dog colony acreage from the current level of approximately 2,200 acres to 300 to 1,000 acres. This alternative would limit the influence of the prairie dog's keystone species role in the mixed-grass prairie communities of the park. By reducing prairie dog acreages and populations by more than half, this alternative would dramatically alter the influence of the prairie dog population in the park and would increase the susceptibility of the prairie dog population to be impacted by stochastic events. This would result in a long-term, moderate adverse effect to prairie dogs.

Wildlife species dependent on prairie dogs and the habitats they create would also be negatively affected by this alternative, as they would essentially lose a portion of their existing habitat within the park without the current number of prairie dogs to maintain their specialized habitat. In general, Alternative D would have a long-term, moderate, adverse effect on wildlife species, as the prairie dog's keystone role would become diminished.

Species that rely upon the black-tailed prairie dog as a source of prey such as the ferruginous hawk, golden eagle, and other avian and mammalian predators would also be affected, as their

prey source would be diminished, forcing them to expend more energy foraging. This would result in a long-term, moderate, adverse effect to these species.

As demonstrated in Table 12, the decrease in prairie dogs as a result of Alternative D would not cause an over-allocation of forage for wildlife, even under present conditions for other grazers. The maximum prairie dog acreage, 1,000, would result in a total of 9,665 AUMs of available forage. Current ungulate numbers require 9,342 AUMs of forage (as seen in Table 11). This would result in an excess of 323 AUMs of available forage.

TABLE 11. WILDLIFE FORAGE NEEDS UNDER PRESENT CONDITIONS FOR ALTERNATIVE D

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	330	4,752
Elk – Average, Year Round	425	3,060
Elk – Average, Winter Only	425	1,530
Total AUMs required		9,342

Available forage and prairie dog acreage of 1,000 equates to 9,665 AUMs available for the above-mentioned ungulates.

Because the park could reduce elk numbers while increasing bison in the future, decreasing prairie dog acreage under Alternative D would not cause an over-utilization of forage for ungulates. The maximum prairie dog colony acreage, 1,000, would result in a total of 9,665 AUMs available for ungulates. Proposed ungulate numbers require 7,650 AUMs of forage (as seen in Table 12). This would result in an excess of 2,015 AUMs of available forage.

TABLE 12. WILDLIFE FORAGE NEEDS AFTER POTENTIAL BISON INCREASE AND ELK REDUCTION UNDER ALTERNATIVE D

Species	Estimated Adult Numbers	Total Animal Unit Months (AUMs)
Bison	400	5,760
Elk – Average, Year Round	175	1,260
Elk – Average, Winter Only	175	630
Total AUMs required		7,650

Available forage and prairie dog acreage of 1,000 equates to 9,665 AUMs available for the above mentioned ungulates.

A large-scale reduction in prairie dog populations in the park would have the potential to increase the forage available to ungulates in the park, although the more nutritious forage in and around prairie dog towns would be decreased and adequate forage already exists. Under this alternative, the effects to ungulate species would be long term, negligible and adverse.

Lethal controls would be used to implement the population reductions associated with this alternative. Although the use of zinc phosphide has been approved by various federal and state agencies as a “safe” method of lethal control, there is still the possibility that species not targeted for control could be adversely affected directly or by the introduction of toxins into the food chain. This effect was recently illustrated in a prairie dog control effort taken by state contractors on private land adjacent to Buffalo Gap National Grasslands, north of Badlands National Park, where three horned lark deaths were suspected to be caused by poisons used to control prairie dogs (Miller 2004). Effects on non-target species associated with the use of rodenticide would be short term (from a population perspective), minor, and adverse to other wildlife species that are associated with prairie dog colonies.

Cumulative effects. As described under the previous alternatives, other plans and projects would have an overall effect to wildlife and habitats that would be minor, beneficial, and long term. Alternative D would have a long-term, moderate, adverse contribution from the relatively large population reduction of black-tailed prairie dogs, therefore causing cumulative effects to be long term, minor, and adverse.

Conclusion. Alternative D would have a long-term, moderate adverse effect on the prairie dog. The effect on wildlife species that are associated with the prairie dog and its habitat would be moderate, long term, and adverse, because the prairie dog’s keystone role would be diminished. Under this alternative, the effects to ungulate species and their forage would be long-term, adverse, and negligible, because higher nutrition forage in prairie dog colonies would be substantially reduced. Effects from zinc phosphide would be short term (from a population perspective), minor, and adverse to other wildlife species that are associated with prairie dog colonies.

Alternative D would not produce major adverse impacts on wildlife resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s general management plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife resources or values as a result of the implementation of Alternative D.

VEGETATION

Affected Environment

The dominant vegetation types at Wind Cave National Park are the mixed-grass prairie, ponderosa pine stands, and riparian communities.

Mixed-grass prairie

Approximately 75 percent of the park is classified as a prairie ecosystem, dominated by blue grama, western wheatgrass, and little bluestem. This system also supports a variety of forbs and shrubs. Yucca, prairie clover, prickly pear, black-eyed Susan, and cinquefoil add color and fragrance to the vegetative community (NPS 1994a).

Prairie is maintained primarily through fire. Fire reduces the encroachment of trees into prairie. The park is currently implementing prescribed burns, partially as a measure to maintain prairie. Prescribed burns are regularly performed in the park to reduce hazardous buildup of fuels and imitate the natural fire cycle. The park plans to burn between 2,000 and 4,000 acres a year depending upon funding and weather. Grasslands should be treated every three to five years, and forested areas are treated every 10 to 20 years. Manual fuels reduction is also performed to reduce the potential for catastrophic fire (NPS 1994a).

Precipitation in the prairie ecosystem is limited, but variable. In mixed-grass prairie, precipitation is 75 percent below average three out of every 10 years (Hays 1994). Vegetation in prairies has evolved along with fire and variable precipitation. Prairie plants have extensive root systems below the ground that allow them to recover quickly after fires. Grasses are also more suited to limited precipitation than woody plants (Hays 1994).

Wind Cave National Park is located in the Semiarid Pierre Shale Plains ecoregion (USGS No date [b]). In this region, the mixed-grass prairie is dominated by shortgrass species, such as little bluestem and buffalograss. Because mixed-grass prairie is intermediate between tallgrass prairies to the east and shortgrass prairies to the west, plant diversity is higher in this prairie type (USGS No date [a]).

As a prairie dog colony ages, vegetative cover and biomass decrease and perennial grasses can be displaced by annual forbs within 2-8 years (Archer 1987, Coppock et al. 1983). As a result of this vegetation composition change, vegetation communities tend to move from a late intermediate seral stage towards an early seral stage. This conversion to an early seral stage may increase the potential of exotic plant species and the potential for weed seeds to be transported throughout the park, although this effect would be negligible.

Over time, prairie dog colonies result in reduced litter, an increase in the proportion of total live vegetation (relative to standing dead), and increased nitrogen concentrations in plants in comparison to uncolonized mixed-grass prairie (Coppock 1981). Climatic factors such as the intensity and frequency of precipitation also partially regulate vegetation responses, bison use, and prairie dog grazing pressure in and around prairie dog towns (Cid 1987).

Prairie dogs themselves cannot be considered solely responsible for vegetation changes among stands, since their activities are known to modify the grazing patterns of other herbivores. A variety of ungulates, small mammals, insects and root-feeding nematodes preferentially utilize vegetation on prairie dog colonies (Hansen and Gold, 1977, O'Meillia *et al.* 1982, Coppock *et al.* 1983, Ingham and Detling 1984 as cited in Archer *et al.* 1987).

Black-tailed prairie dogs play an important role in ecosystem dynamics of the mixed-grass prairie. A literature review examining the prairie dog as a keystone species highlights that prairie dogs are responsible for increased nitrogen uptake by plants, increase soil mixing, increase the

rates of energy and material flows, increased absorption rate of water, and influence overall patch dynamics and landscape heterogeneity (Kotliar *et al.* 1998). By influencing nutrient cycling, soils, and the diversity of habitats present in an area, prairie dogs are a contributing factor to ecosystem regulation in the mixed-grass prairie ecosystem.

During 2005, Wind Cave National Park adopted an interim estimated annual forage production (during average years of precipitation) of 31,804,932 pounds of forage, or 40,256 AUMs (NPS 2005c), based on information obtained from the Natural Resources Conservation Service (NRCS) South Dakota Technical Guide, Section II: Rangeland, Grazed Forestland, Native Pastureland and Interpretations. The NRCS information considers many factors, including climate, soils and slope and provides estimated total annual production potentials for individual ecological sites. These estimated production potentials were developed, in part, for the ranching community and estimate production in the absence of major grazers (*i.e.*, cattle, sheep, bison, elk, and the effects of habitat alteration by prairie dogs). The NRCS recommends that prairie dog acreage be included at a lower production rate by changing the seral stage from late-intermediate to early-intermediate. The NRCS recommends that 25 percent be allocated for large ungulate (bison and elk), 50 percent reserved for plant health, and the remaining 25 percent allocated for small mammals, trampling, insects, and hail damage.

The number of acres in prairie dog towns has an effect on the number of pounds of forage that the park can produce. Currently, the park has approximately 2,200 acres of prairie dog towns. As these acres trend from late intermediate to early intermediate seral stage, the park estimated annual forage production will decrease from 10,065 AUMs to 9,625 AUMs. If these acres trend from late intermediate to early seral stage, the estimated annual forage production will decrease from 10,065 AUMs to 9,185 AUMs. In an effort to be as conservative as possible, the park has decided to consider all prairie dog acres as early seral stage, resulting in an estimated 9,185 AUMs available to elk and bison. Stocking rates (AUMs) for range sites and forage production information are included in Appendix B.

Eventually, the park will shift to an estimated annual forage production based on the findings of a long-term range monitoring project begun in 2004, and the findings of an anticipated forage allocation research project.

Range transect data collected by park staff during 2004 indicate that range conditions in the park are, on average, “good”, with some areas being “fair” (Curtin pers. comm. 2005). These conditions are characterized by the NRCS rating system for rangelands, which includes “poor, or early seral stage”, “fair, or early intermediate seral stage”, “good, or late intermediate seral stage”, and “excellent, or late seral stage (climax)”. The NRCS range condition assessment, based on older Soil Conservation Service methods, generally considers the amount of forage produced and a relative degree of climax community present on the rangeland (Pamo *et al.* 1991). Note that these guidelines were developed with commodity production in mind rather than addressing biodiversity or wildlife values.

Ponderosa pine forest and riparian communities

The remaining 25 percent of the park outside the mixed-grass prairie is forested and not included in the project area analyzed by this environmental assessment, because prairie dogs do not use

this habitat. As elevation increases, ponderosa pine (*Pinus ponderosa*) communities tend to dominate. Other conifers include Rocky Mountain juniper (*Juniperus scopulorum*) and common juniper (*Juniperus communis*). Along streams and in canyon bottoms, deciduous trees, including green ash (*Fraxinus pennsylvanica*), boxelder (*Acer negundo*), bur oak (*Quercus macrocarpa*), plains cottonwood (*Populus deltoides*), American elm (*Ulmus americana*), and paper birch (*Betula papyrifera*) are common.

Non-native species

About 20 percent of the 495 species of vascular plants that have been recorded at Wind Cave National Park are exotic, with three of these species classified as noxious weeds by the state of South Dakota or Custer County. Among these non-native plants, Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis*), dandelion (*Taraxacum officinale*), smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), yellow sweet clover (*Melilotus officinalis*), and white clover (*Melilotus lupulina*) are found in disturbed areas, especially along highways. Most of the non-natives species occur as small populations, and park staff participate in control methods to reduce and/or eradicate them from the park.

Effects of Alternative A – the No Action Alternative

Continuing current management would allow for continued expansion of prairie dog colonies in Wind Cave National Park if regional drought conditions persist. Mixed-grass prairie vegetation would be altered in local areas in and around the colonies as a result of expansion. The peak standing crops would be reduced in edges and older cores of prairie dog towns, the species composition would change in the core areas of prairie dog towns, and reduced litter and an increased proportion of live vegetation (to standing dead) would occur throughout the colonies (Coppock 1981). If precipitation trends move toward average precipitation levels, prairie dog colony acreage may stabilize at current levels, as the need to disperse to find adequate forage would be reduced with increased primary production associated with normal precipitation. Drought has been documented as a factor in prairie dog expansion in South Dakota. At Buffalo Gap National Grassland, annual colony expansion rates have been measured at 25 percent during drought conditions (USFWS 2005a). The black-tailed prairie dog's role in ecosystem dynamics of the mixed-grass prairie would continue to provide benefits to vegetative communities in the park, because the prairie dog helps to maintain a diversity of plant communities within the prairie ecosystem. Effects to vegetation under the No Action Alternative would be long term, minor to moderate, and beneficial from vegetation changes in and near prairie dog colonies that would increase the diversity of vegetative communities in the park.

Under an unregulated management program, prairie dog colonies would be left to expand or contract. If prairie dogs were to expand into all 8,566 acres of potential habitat, they would inhabit 51 percent of the park's rangelands, including 1,363 acres of preferred habitat and 7,203 acres of suitable habitat. If colonies contracted, there would be no mechanism to keep them from being extirpated from the park.

Under Alternative A, mowing would continue in prairie dog colonies to limit the expansion of thistle and other non-native species. However, not all prairie dog colonies are accessible to mowing equipment. If the prairie dog population in the park expands, the potential increase of exotic species associated with prairie dog colonies would create a long-term, local, minor and adverse effect on vegetative resources. If, however, the prairie dog colonies declined, the associated exotic species would decline, resulting in a long-term, local, minor beneficial effect. Overall, effects to vegetation would be long term, negligible, and adverse. Mowing would also have a short-term, minor, adverse effect on vegetation structure.

To assess vegetation grazing levels by ungulates in the park, the park relies on a forage allocation model (see the “Wildlife” section for details). Currently, the model shows forage to be 157 AUMs under what is required for ungulates. Although it is yet to be determined, the park, through elk and bison management plans, may adjust their population numbers accordingly to fit the forage requirements needs of 7,650 AUMs. This would be a smaller amount than allocated to wildlife forage needs. Forage would not be over-utilized by wildlife; therefore, there would be no adverse effects from wildlife grazing if elk and bison populations were hypothetically reduced. Under present conditions, effects to vegetation would be negligible and adverse from a slight over-utilization of forage by wildlife.

Cumulative effects. Other plans and projects, such as the highway rehabilitation and wastewater treatment system projects, vegetation management plan, fire management plan, and exotic plant management plan/environmental assessment, would have long-term, minor, beneficial effects on vegetation in the park. The No Action Alternative would make a long-term, minor to moderate, beneficial contribution to effects on park vegetation, resulting in overall long-term, minor, beneficial cumulative effects.

Conclusion. Effects to vegetation under the No Action Alternative would be long-term, minor to moderate, and beneficial from vegetation changes in and near prairie dog colonies that would increase the diversity of vegetative communities in the park. Under present conditions, effects on vegetation from a slight over-utilization of forage to wildlife would be negligible and adverse. If elk and bison populations were reduced, hypothetically, forage would not be overallocated to wildlife; therefore, there would be no adverse effects from wildlife grazing. Because of potential expansion of prairie dogs and continued mowing efforts in prairie dog towns, effects of prairie dog expansion affecting exotic plants would have long-term, negligible, adverse effects on vegetation. Mowing would also have a short-term, minor, adverse effect on vegetation structure.

Alternative A would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s general management plan or other National Park Service planning documents. Consequently, there would be no impairment of vegetation resources or values as a result of the implementation of Alternative A.

Effects of Alternative B – High Acreage Target

Alternative B would encourage prairie dog colony acreage expansion from the approximately 2,200 acres currently present up to 3,000 to 5,000 acres. This increase in acreage would result in

vegetative structure and composition changes over approximately 800 to 2,800 acres of mixed-grass prairie. Vegetative communities would eventually shift towards fewer grasses, more forbs, higher plant diversity, and a shorter canopy height. The changes that would occur represent a different vegetative community from the climax community that would likely occur in the absence of prairie dogs. With relatively normal rainfall, the vegetation shift that would occur with greater prairie dog colony acreage would represent the community that has evolved in the presence of prairie dogs and ungulate grazers. Under drought conditions, such as have occurred over the past several years, increased prairie dog acreage could have a long-term, minor to moderate, adverse effect on vegetation, as forage resources become scarce and competition among grazers results in overuse of the vegetation resource. However, effects of prairie dog expansion under Alternative B would also have a long-term, moderate, beneficial effect on vegetation in the park, by increasing heterogeneity of the landscape and increasing the prairie dog's role in ecosystem regulation in the prairie ecosystem in the park (Kotliar *et al.* 1998).

Mowing would continue in prairie dog colonies to prevent the expansion of thistle and other non-native species. As with the current situation, not all prairie dog colonies are accessible to mowing equipment. Mowing to control the establishment of exotic species would result in long-term, minor beneficial effects to vegetation, as it would help minimize non-native species from encroaching upon native mixed-grass prairie. Mowing could also be used as a technique to encourage expansion of prairie dogs into new areas. Mowing prairie dog colonies and prairie to expand prairie dog habitats would have a short-term, minor, adverse effect on vegetation structure and long term, minor, beneficial effects, as it would help prevent non-native species from encroaching upon native mixed-grass prairie.

Because the park could reduce elk numbers, while incrementally increasing bison, the increase in prairie dogs under Alternative B would not cause overgrazing of rangeland vegetation overall. The maximum prairie dog colony acreage, 5,000, would result in a total of 8,065 AUMs of forage available for ungulates (bison and elk). If the park were to decrease elk numbers to approximately 350 and increase the bison herd to 400, the estimated forage needs would be approximately 7,650 AUMs, which is below the available forage of 8,065 AUMs. With current ungulate numbers, the forage need is 9,342 AUMs. This is 1,277 AUMs more than the 8,065 AUMs estimated to be available if the park were to increase to 5,000 acres of prairie dogs.

Cumulative effects. Other plans and projects would have a long term, minor, beneficial effect on vegetation. Alternative B would make a long-term, minor to moderate, beneficial contribution, unless drought conditions led to overgrazing. When combined, the cumulative effects would be minor and beneficial, because the proportion of vegetation in the park affected by the increased prairie dog acreage would be relatively small. During drought conditions severe enough to lead to overgrazing, Alternative B would contribute long-term, minor to moderate, adverse effects, resulting in an overall cumulative effect of long term, minor, and adverse.

Conclusion. Effects of prairie dog expansion under Alternative B would have a long-term, minor to moderate, beneficial effect on vegetation in the park by increasing the diversity of vegetative communities within the park. The intensity would be dependent upon precipitation's role in colony expansion. If drought conditions persist and prairie dogs expand their acreage, there is the potential for competition between ungulate grazers and prairie dogs for limited forage resources, which could result in a long-term, minor to moderate, adverse effect on vegetation. Continuing

mowing in and around prairie dog colonies would have a long-term, minor, beneficial effect on vegetation, as it would minimize the expansion of non-native species, such as thistle. Mowing prairie dog colonies and prairie to expand prairie dog habitats would have a short-term, minor, adverse effect on vegetation structure and a long-term, minor, beneficial effect on vegetation by preventing the expansion of non-native species.

Alternative B would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of vegetation resources or values as a result of the implementation of Alternative B.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Alternative C would maintain prairie dog colony acreage in the park between 1,000 and 3,000 acres. By maintaining, or slightly decreasing or increasing prairie dog acreage, mixed-grass prairie vegetation could be affected in local areas around the colonies. As described under the effects of Alternative B, the vegetative communities would change and result in a different community structure and species composition than if prairie dogs were absent. Alternative C would result in long-term, negligible to minor, adverse effects on vegetation if colony expansion under drought conditions led to competition for forage. However, prairie dogs would play an important role in ecosystem regulation and maintenance of a diversity of vegetative communities, which would result in long-term, minor to moderate, beneficial effects on vegetation.

Exotic plant species, some of which may be invasive, may increase in acreage and distribution. Mowing would continue in prairie dog colonies to prevent the expansion of thistle and other non-native species. As with the current situation, not all prairie dog colonies are accessible to mowing equipment. This would result in long-term, minor, beneficial effects to vegetation, as it would help prevent non-native species from encroaching upon native mixed-grass prairie. Mowing could also be used as a technique to encourage expansion of prairie dogs into new areas, although it would be limited under Alternative C. Mowing prairie dog colonies and prairie to expand prairie dog habitats would have a short-term, minor, adverse effect on vegetation structure.

Because the park could reduce elk numbers, while incrementally increasing bison in the future, the prairie dog population associated with Alternative C would not cause overgrazing of rangeland vegetation overall in this scenario, according to the forage allocation model. The maximum prairie dog colony acreage, 3,000, would result in a total of 8,865 AUMs of forage available for ungulates (bison and elk). If the park were to decrease elk numbers to approximately 350 and increase the bison herd to 400, the estimated forage needs would be approximately 7,650 AUMs, which is below the available forage of 8,865 AUMs. With current ungulate numbers, the forage needed is 9,342 AUMs. This is above the 8,865 AUMs estimated to be available if the park were to increase to 3,000 acres of prairie dogs.

Cumulative effects. Cumulative effects of Alternative C and other plans and projects would be the same as those described for Alternative A (long term, minor, beneficial).

Conclusion. Under Alternative C, prairie dogs would play an important role in ecosystem regulation and maintenance of a diversity of vegetative communities, which would result in long-term, minor to moderate, beneficial effects on vegetation. If colony expansion under drought conditions led to competition, Alternative C could result in long-term, negligible to minor, adverse effects on vegetation. Continuing mowing in and around prairie dog colonies would have a long-term, minor, beneficial effect on vegetation, as it would prevent the expansion of non-native species, such as thistle. Mowing prairie dog colonies to expand prairie dog habitats would have a short-term, minor, adverse effect on vegetation structure.

Alternative C would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of vegetation resources or values as a result of the implementation of Alternative C.

Effects of Alternative D – Low Acreage Target

Alternative D would reduce prairie dog colony acreage to 300 to 1,000 acres.

Over time vegetative communities in portions of the mixed-grass prairie where prairie dog colonies would be removed would experience a shift away from forbs, plant diversity would decrease, and taller grasses would likely return. Such changes would in part depend on adequate precipitation and relief from grazing pressure of other species. As a result of these potential changes, the prairie dog's role in ecosystem regulation would be markedly reduced, resulting in a long-term, minor to moderate, adverse effect.

Under this alternative, prairie dog colonies would be reduced by 1,200 to 1,900 acres. During occupancy, prairie dog towns trend fairly quickly towards early seral stage vegetation, often dominated by annual forbs. Controlling black-tailed prairie dogs on rangeland in western South Dakota does not always result in a positive increase in forage production after 4 years (Uresk 1985). Total exclusion from herbivores for 9 years or more may be required to increase forage production when the range is in a low (early seral stage) condition class (Uresk and Bjugstad 1983). More than 4 years of reduced prairie dog densities may be required to obtain an increase in forage production (Uresk 1985).

Mowing would continue in prairie dog colonies to minimize the expansion of thistle and other non-native species. This would result in long-term, minor beneficial effects to vegetation, as it would help prevent non-native species from encroaching upon native mixed-grass prairie. It would be unlikely that mowing would be used to encourage expansion of prairie dogs into new areas under Alternative D.

This alternative could result in a reduction in exotic plants within the park, by reducing or eliminating the amount of disturbance that occurs in some areas, thereby providing an

opportunity for recovery to a native plant community. This would cause a long term, minor, beneficial effect to vegetation.

The maximum prairie dog acreage of 1,000 would result in a total of 9,665 available AUMs. The current number of bison and elk require 9,342 AUMs. If elk numbers were reduced and bison numbers increased in the future, a total of 7,650 AUMs would be required in this scenario. The reduced acreages of prairie dogs would likely ensure no overgrazing would occur to the park's vegetation, which would be a long-term, minor, beneficial effect, as the reduction in other species' numbers would also ensure no overgrazing would occur, according to the forage allocation model.

Cumulative effects. Effects of all other related plans and projects would be similar to those described for Alternatives B and C (*i.e.*, a long-term, minor, beneficial effect). Alternative D would contribute a long-term, minor, adverse effect to the combined effects of other plans and projects because of the reduced role of the prairie dog in ecosystem regulation and vegetative community diversity, resulting in an overall long term, negligible, adverse, cumulative effect.

Conclusion. Under Alternative D, the prairie dog's role in ecosystem regulation would be reduced, a long-term, minor to moderate, adverse effect. The reduced acreages of prairie dogs would ensure no overgrazing would occur to the park's vegetation, which would be a long-term, minor, beneficial effect. Mowing would continue in prairie dog colonies to prevent the expansion of thistle and other non-native species, resulting in long-term, minor, beneficial effects to vegetation.

Alternative D would not produce major adverse impacts on vegetation resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of vegetation resources or values as a result of the implementation of Alternative D.

ENDANGERED AND THREATENED SPECIES

Affected Environment

The black-tailed prairie dog was removed from the candidate list to be listed as threatened under the Endangered Species Act in August 2004 by the U.S. Fish and Wildlife Service, when they determined that prairie dog numbers were not low enough to warrant listing, among other factors. Because black-tailed prairie dogs are no longer a candidate species under the Endangered Species Act, they no longer have any special status within the National Park system. For an analysis of effects on black-tailed prairie dogs, refer to the "Wildlife" section. There are no designated critical habitats in Wind Cave National Park. Three federally listed threatened, endangered or candidate animal species may occur in the park; refer to Table 13 for details regarding these species. There are no plant species in the prairie ecosystem at Wind Cave National Park eligible for federal or state protection.

The historical range of the black-footed ferret included Custer County and Wind Cave National Park. This species is one of the most endangered mammals in the United States. Black-footed ferrets are highly dependent on prairie dog colonies for habitat and prey (NPS 1994a). The last observation of black-footed ferrets in the park was in 1977. An extensive survey, conducted in 1990, failed to locate this species in the park (Muenchau pers. comm. 2002). The park is in the process of preparing a management plan and environmental assessment to analyze the potential for reintroduction of the black-footed ferret to the park, although the reintroduction plan is on hold until completion of this plan and environmental assessment. The potential for interaction between ferret reintroduction and the proposed action is addressed later in this section.

In South Dakota, the bald eagle is primarily a migrant and wintering species. No nesting sites are known to occur in the park. Migrating eagles are observed in the park in open valleys and roosting in large trees within floodplains during winter months (Muenchau pers. comm. 2002). They are regarded as casual and transient visitors to the park. The nearest regular bald eagle concentration occurs at Angostura Reservoir, approximately 12 miles south of the park (NPS 1994a).

The American burying beetle was recorded historically in 35 states, as well as along the southern edges of Ontario, Quebec and Nova Scotia. Records indicate that the decline of the population was underway, if not complete, by 1923. Habitat requirements for the American burying beetle are not well understood (USFWS 2005b). The American burying beetle is now known to occur in five states: Nebraska, South Dakota, Rhode Island, Oklahoma and Arkansas (SDGFP 2005b). The South Dakota Natural Heritage Program has documented an approximately 1,000 square mile area in southern Tripp and Gregory counties with substantial populations of the American burying beetle (Backlund pers. comm. 2002). One historic sighting was recorded 150 miles east of Wind Cave National Park, but there have been no documented occurrences within the park (NPS 1994a). It is likely not present in the park. Therefore, American burying beetles will not be further analyzed for each alternative.

**TABLE 13. FEDERALLY LISTED ENDANGERED, THREATENED, AND
CANDIDATE SPECIES WITH POTENTIAL TO OCCUR IN WIND CAVE NATIONAL PARK, SOUTH
DAKOTA**

Common Name Scientific Name	Listing Status	Designated Critical Habitat	Habitat Requirements
Black-footed ferret <i>Mustela nigripes</i>	Endangered	No	The ferret lives in association with prairie dog colonies, although it is currently extirpated from the park.
Bald eagle <i>Haliaeetus leucocephalus</i>	Threatened	Yes, but not in the park.	The bald eagle ranges over most of the north American continent, from as far north as Alaska and Canada, south to northern Mexico.
American burying beetle <i>Nicrophorus americanus</i>	Endangered	No	The American burying beetle's habitat includes open pasture and the forest/grassland ecotone. However habitat requirements are not completely understood.

Effects of Alternative A – the No Action Alternative

Because there are currently no ferrets in the park, continuing current management would have an unknown effect on black-footed ferrets. However, the total prairie dog colony acreage in the park could potentially support a black-footed ferret reintroduction. In the past, the U.S. Fish and Wildlife Service has targeted prairie dog colonies of 5,000 acres or more. However, because plague-free sites on public lands are extremely limited, smaller acreages are likely to be considered for ferret reintroductions. If black-footed ferrets were reintroduced to Wind Cave National Park, this alternative would have a long-term, moderate, beneficial effect on the black-footed ferret.

The bald eagle would not be affected by continuing current prairie dog management because actions associated with the limited management that does take place, such as trapping and relocating prairie dogs from developed areas, would have no effect on the bald eagle or its habitat.

Cumulative effects. The park provides protection for the wildlife species and ecosystems of the Black Hills region. The effect of this refuge and habitat preservation on the endangered and threatened species in the area would be negligible. Other park plans and projects, such as the rehabilitation of Highway 87 and resource management plans, would not affect endangered or threatened species. Regionally, other plans and projects including the National Black-footed Ferret Recovery Plan would overall have minor, beneficial effects to endangered and threatened species. The South Dakota Game, Fish, and Parks' Black-tailed Prairie Dog Conservation and Management Plan proposes using lethal prairie dog control on private lands and assisting private landowners adjacent to federal lands with the cost of implementation, thus potentially contributing a long-term, minor, adverse effect regionally to black-footed ferret populations. Implementation of the No Action Alternative would not contribute to the cumulative effects associated with other plans and projects. However, if the black-footed ferret was reintroduced, the No Action Alternative would contribute a long-term, moderate, beneficial effect, as long as the prairie dog population remained approximately as it is now or increased, resulting in a cumulative long-term, minor to moderate, beneficial effect on endangered and threatened species.

Conclusion. There would be no effect to endangered and threatened species by continuing current management activities because no endangered and threatened species currently are likely to be present in areas where black-tailed prairie dog management activities would occur, and the actions that are likely to be taken would not affect any transient sensitive species under the No Action Alternative. However, if the black-footed ferret were to be reintroduced, the No Action Alternative would result in a long-term, moderate, beneficial effect. Alternative A would likely affect, but not likely adversely affect the black-footed ferret. There would be no effect to the bald eagle.

Alternative A would not produce major adverse impacts on endangered and threatened species or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there

would be no impairment of endangered and threatened species or values as a result of the implementation of Alternative A.

Effects of Alternative B – High Acreage Target

Under Alternative B, 3,000 to 5,000 acres of prairie dog colonies would have the potential to support a black-footed ferret population in the park. In the past, the U.S. Fish and Wildlife Service has preferred reintroduction sites that are plague-free and have at least 5,000 acres of prairie dog colonies. The U.S. Fish and Wildlife Service is revising the Black-footed Ferret Recovery Plan and it is anticipated that more emphasis will be placed on reintroducing ferrets to sites with less than 5,000 acres. The park has received qualified encouragement from the U.S. Fish and Wildlife Service that the park could be suitable for a ferret reintroduction effort. If black-footed ferrets were reintroduced to Wind Cave National Park, this alternative would have a moderate, long-term, beneficial effect (may affect, but not likely to adversely affect) on the ferret, because it may provide a plague-free prey base that is large enough to support a black-footed ferret population.

The bald eagle would not be adversely affected (may affect, but not likely to adversely affect) by actions under this alternative because bald eagles are casual visitors to Wind Cave National Park, using the park for foraging. The only potential aspect in which bald eagles could be affected by prairie dog management would be from zinc phosphide. The unlikely event of consumption of zinc phosphide-poisoned prairie dogs could affect bald eagles. To ensure this would not occur, if lethal controls were used in the No Prairie Dog Zone or Active Management Zone under Alternative B, park staff would monitor control sites, especially when eagles were sighted in the park, to ensure that no prairie dog carcasses remained on the surface. This mitigation measure would minimize the potential to expose eagles to rodenticide. Because zinc phosphide does not greatly accumulate in muscle tissue and most animals do not eat the digestive tract (EXTOXNET 2005), secondary effects of using zinc phosphide to control prairie dogs are unlikely for bald eagles or other predators (see the “Wildlife” section).

Cumulative effects. The park provides protection for the wildlife species and ecosystems of the Black Hills region. The cumulative effect of this refuge and habitat preservation on the endangered and threatened species of the area would be beneficial, minor, and long term. Regionally, other plans and projects including the National Black-footed Ferret Recovery Plan would overall have minor, beneficial cumulative effects to endangered and threatened species. The South Dakota Department of Game, Fish and Parks’ Black-tailed Prairie Dog Conservation and Management Plan and private landowners support the widespread use of lethal prairie dog control, which on a large scale has the potential for affecting other species, including the black-footed ferret, thus contributing to a long-term, minor, adverse effect in the region to endangered and threatened species. Alternative B would contribute a long-term, moderate to major, beneficial effect if the black-footed ferret was reintroduced, resulting in a cumulative long-term, minor, beneficial effect on endangered and threatened species.

Conclusion. There would be a potential long-term, moderate, beneficial effect (may affect, but not likely to adversely affect) on the black-footed ferret if prairie dog acreage and prairie dog population management were sufficient to support a ferret reintroduction. Alternative B would

likely affect, but not likely adversely affect, the black-footed ferret, if it were reintroduced, and bald eagles that use the habitats in the park.

Alternative B would not produce major adverse impacts on endangered and threatened species or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of endangered and threatened species or values as a result of the implementation of Alternative B.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Under Alternative C, the total prairie dog colony acreage in the park could potentially support a black-footed ferret reintroduction. In the past, the U.S. Fish and Wildlife Service has targeted prairie dog colonies of 5,000 acres or more. However, because plague-free sites on public lands are extremely limited, smaller acreages are likely to be considered for ferret reintroductions. If black-footed ferrets were reintroduced to Wind Cave National Park, this alternative would have a long-term, moderate, beneficial effect (may affect, but not likely to adversely affect) on the black-footed ferret.

The effects of lethal prairie dog management actions on the bald eagle would be similar to those described for Alternative B (no effect).

Cumulative effects. The cumulative effects associated with Alternative C are similar to those described for Alternative B (long term, minor, adverse). However, Alternative C would contribute a long-term, moderate, beneficial effect to the overall effects.

Conclusion. There would be a potential long-term, moderate, beneficial effect on the black-footed ferret if prairie dog colony acreage were sufficient to support a ferret reintroduction. Alternative C would affect, but not likely adversely affect, listed threatened or endangered species in the park.

Alternative C would not produce major adverse impacts on endangered and threatened species or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of endangered and threatened species or values as a result of the implementation of Alternative C.

Effects of Alternative D – Low Acreage Target

Under Alternative D, it is unlikely that black-footed ferrets would be reintroduced to the park, because a population of 300 to 1,000 acres of black-tailed prairie dogs in the park would probably not be adequate to support a self-sustaining ferret population. There would be no effect

to the black-footed ferret because the opportunity to reintroduce the ferret would likely not be available.

The effects of lethal prairie dog management actions on the bald eagle would be similar to those described for Alternative B, although efforts to ensure that lethally controlled prairie dog carcasses were not available for eagle consumption would be much greater. Enhanced mitigation would be necessary because the use of lethal controls would likely be greater under Alternative D in order to achieve the targeted reductions in prairie dog populations. Nonetheless, adverse effects to the bald eagle would be unlikely because of mitigation measures taken to minimize the potential exposure of bald eagles (or other predators and wildlife species) to rodenticides used to reduce the prairie dog population.

Cumulative effects. The park provides protection for the wildlife species and ecosystems of the Black Hills region. The cumulative effect of this refuge and habitat preservation on the endangered and threatened species of the area would be beneficial, minor, and long-term. Regionally, other plans and projects including the National Black-footed Ferret Recovery Plan would overall have long-term, minor, beneficial cumulative effects. Alternative D would contribute negligible, adverse effects to the effects of other plans and projects (long-term, minor, and beneficial), resulting in a negligible to minor beneficial cumulative effect.

Conclusion. Alternative D would affect, but not likely adversely affect, federally listed endangered and threatened species in Wind Cave National Park.

Alternative D would not produce major adverse impacts on endangered and threatened species or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of endangered and threatened species or values as a result of the implementation of Alternative D.

SOCIOECONOMICS

Affected Environment

The National Park Service is committed to local and regional cooperation in considering decisions that may affect the local economics, quality of life for local residents, or natural environment. Socioeconomics are not considered a resource that is protected by the Organic Act. Therefore, socioeconomics do not warrant consideration for impairment.

Wind Cave National Park lies within Custer County in southwestern South Dakota. The park's gateway community, Hot Springs, is approximately 6 miles to the south in Fall River County. The two counties have about the same population – between 7,000 and 7,500 (U.S. Census Bureau 2005). However, Custer County grew by 18 percent between 1990 and 2000, while Fall River County grew by only 1.4 percent. Median annual household income in Custer County (\$36,303) is somewhat less than the national average of \$41,994 and the annual per capita

income is approximately 16.9 percent lower than the rest of the nation (U.S. Census Bureau 2005).

The economy of Custer County, South Dakota is quite diverse and, therefore, stable. Educational, health and social services are the primary industries in Custer County, accounting for 703 of the business establishments in the county (U.S. Census Bureau 2005). Contrary to assumptions of the predominance of agricultural occupations, farming, fishing, and forestry occupations are actually the least common in the county, accounting for only 2.2 percent of the county's occupation (U.S. Census Bureau 2005). The government is the largest employer in the county, with U.S. Forest Service personnel at Black Hills National Forest comprising a large part of the workforce. The second largest employer is the leisure and hospitality industry, employing 24.7 percent of the county's workers (South Dakota Governor's Office of Economic Development 2005). This indicates that the tourism industry, based largely on the national parks and other public lands in the area, is very important to the economy in Custer County.

Wind Cave is part of a regional group of national parks and other recreational sites located in the southern Black Hills of South Dakota. The most visited of the national parks in the area is Mount Rushmore National Memorial, with over 1.8 million recreational visits each year. The Black Hills National Forest and Angostura Reservoir State Recreation Area also contribute to local tourism revenues by drawing both local and regional visitors regularly. The opportunities to view natural scenery, wildlife, pursue recreation, and experience western history make the Black Hills a national tourist destination.

Wind Cave National Park offers visitors the opportunity to experience an intact prairie ecosystem in which they can watch wildlife, such as prairie dogs and bison, throughout the park. The park maintains several pullouts along U. S. Highway 385 and State Route 87 and park roads, which are specifically designed for viewing prairie dogs (in the Bison Flats area of the park). The park is currently developing new wayside exhibits with one focused on prairie dogs. The presence of readily visible prairie dogs is important in attracting wildlife-watching visitors to the park.

The agricultural industry is an important part of the traditional regional economy. There are 303 farms in the county, 177 of which raise and sell cattle and calves (National Agricultural Statistics Service 2002). In the year 2002, 18,408 acres of land in Custer County were used for raising hay and other forage (National Agricultural Statistics Service 2002). The management of prairie dogs in the national park is of concern to many residents because of its correlation with the economic well-being of local agricultural families, particularly with regard to forage allocation. When forage for livestock becomes scarce on grazing lands, ranchers adjust herd sizes by selling cattle, to meet the availability of forage. The availability of forage is altered by various factors: grazing levels, fire, drought, and competing herbivore species. Prairie dogs compete with livestock not only through dietary consumption, but indirectly, by clipping (and not consuming) vegetation to improve predator detection.

Landowners adjacent to Wind Cave National Park currently involved with ranching activities have expressed concerns over the increased number of prairie dogs on their land. Forage has become less plentiful in recent years as a result of drought conditions, and some landowners have

subsequently had to reduce the size of their grazing herds, which represents a financial hardship (Muenchau pers. comm. 2005b). In the past, landowners have independently funded the control of prairie dogs on their land.

Effects of Alternative A – the No Action Alternative

Park staff would continue to meet with neighbors as a result of neighbors' concerns about prairie dog dispersal from the park onto private property. Under this alternative, only minimal control actions would be taken in response to these concerns. Allowing unrestricted movement of prairie dogs from the park to private lands would lead to long-term, local, negligible to minor, adverse effects to socioeconomics, because available forage would decrease on private rangelands.

Park visitors would continue to have the opportunity to view prairie dogs via pullouts throughout the park. These visitors would continue to purchase local amenities and services, benefiting the local economy. The continued presence of the prairie dog as a park attraction for wildlife-viewing visitors would create a long-term, negligible benefit to socioeconomics.

Cumulative effects. The South Dakota Black-tailed Prairie Dog Conservation and Management Plan from the South Dakota Department of Game, Fish, and Parks provides direction for the coordination of prairie dog management efforts being done on public and private lands. This plan states that private landowners directly adjacent to public lands will be assisted in controlling prairie dogs when it is documented that the prairie dogs moved from public to private lands. The South Dakota Department of Game, Fish, and Parks provides annual prairie dog control using rodenticide at no cost to landowners (SDGFP 2005a). The South Dakota Department of Game, Fish, and Parks' prairie dog plan would remove the financial burden of prairie dog control from adjacent private landowners, creating a long-term, minor to moderate, beneficial effect to socioeconomics. Although the state would bear the cost of the program, this effect would be diffused across the state, and economic changes would be below the level of detection in the project area. If prairie dogs emigrate from Wind Cave National Park to private lands beyond adjacent land units, those landowners would not technically qualify for state-funded assistance. The effect of the National Park Service implementing Alternative A on socioeconomics would be both long-term, negligible, and beneficial and long term, negligible to minor, and adverse, through visitors coming to see prairie dogs and effects to other rangelands from prairie dogs emigrating from the park, respectively. Overall cumulative effects, including the state prairie dog management plan and Alternative A, would result in long-term, minor, beneficial effects on socioeconomics.

Conclusion. Under Alternative A, prairie dog populations would likely continue to cross between the park and private land, which could lead to long-term, negligible to minor, adverse effects to socioeconomics due to the loss of forage for livestock. However, the continued presence of the prairie dog as a park attraction for wildlife-viewing visitors would create a long-term, negligible benefit to socioeconomics.

Effects of Alternative B – High Acreage Target

Alternative B would manage for a population of 3,000 to 5,000 acres of prairie dogs, a noticeable increase from the current estimate of 2,200 acres in the park. This could result in an increase of prairie dog dispersal across park boundaries, to and from private land, which would potentially create socioeconomic impacts for private landowners because of reduced forage.

This alternative would include the implementation of an Active Management Zone, in which prairie dogs would be controlled in areas adjacent to lands not desiring prairie dogs moving onto private land (where documented and substantiated by National Park Service staff). This could include the use of lethal control methods. Despite the high population of prairie dogs within the park, adjacent landowners would not experience any additional financial burden, because the Active Management Zone would attempt to contain prairie dogs within the park and direct the colonies inward from the boundary. This would result in long-term, local, minor benefits to socioeconomics.

This alternative would also include the potential for the use of landowner incentives or conservation easements, which could provide some small financial benefits (tax benefits or compensation) for landowners, in exchange for maintaining prairie dog habitat on their land. These incentives would not be funded by the National Park Service, but would have to be funded through private or other non-NPS organizations or individuals. This could represent a long-term, local, negligible benefit to socioeconomics.

As in Alternative A, visitors would continue to have the opportunity to view prairie dogs via pullouts throughout the park. The increased population numbers anticipated in Alternative B would make prairie dogs more readily visible and maintain the long-term, negligible benefit to socioeconomics related to wildlife viewing.

Cumulative effects. As in Alternative A, the South Dakota Black-tailed Prairie Dog Conservation and Management Plan would minimize the financial hardship of private landowners adjacent to the park who are funding their prairie dog removal. Though the Active Management Zone in Alternative B would attempt to keep most prairie dogs within the park, the South Dakota Department of Game, Fish and Parks would give free assistance for prairie dog control on private lands, when it is documented that they have encroached from adjacent public lands. Those landowners not adjacent to the park would still bear some financial burden if prairie dogs from the park were to immigrate to their land. The reduced burden for adjacent landowners would create a long-term, minor, cumulative beneficial effect to socioeconomics. This effect in combination with the long-term, negligible to minor benefits of implementing Alternative B, would result in long-term, minor cumulative benefits to socioeconomics.

Conclusion. Alternative B would produce long-term, negligible to minor benefits to socioeconomics, resulting from the reduced financial strain from funding prairie dog management that would result from the use of an Active Management Zone and the potential tax benefits or compensation associated with the use of potential landowner incentives or conservation easements. The high numbers of visible prairie dogs would maintain wildlife viewing opportunities, creating a long-term, negligible benefit to socioeconomics.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Under Alternative C, the prairie dog population would range from 1,000 to 3,000 acres. While no formal Active Management Zone would be employed, prairie dog activity near the park boundary would be monitored as a result of discussions with local landowners and any movement out of the park would be controlled on a case-by-case basis, to prevent the prairie dogs from encroaching on private land. The prairie dog population would have a chance of dispersing to private lands, potentially creating socioeconomic impacts for private landowners affected by reduced forage availability. This represents a long-term, local, negligible, adverse effect to socioeconomics. However, the use of case-specific active control actions by the park would somewhat offset this adverse effect.

As in Alternative B, the use of landowner incentives or conservation easements funded by private or other non-NPS entities could provide tax benefits or compensation for landowners. This could represent a long-term, local, negligible benefit to socioeconomics.

Wildlife viewing opportunities would continue and would have a long-term, negligible benefit to socioeconomics.

Cumulative effects. Cumulative effects would be similar to those in Alternative B, but to a incrementally greater degree, because this alternative involves no Active Management Zone and would potentially allow more prairie dogs to cross between public and private land. The free assistance available from the South Dakota Department of Game, Fish and Parks, coupled with the effects of case-specific control actions within the park (long term, negligible to minor benefits), would create long-term, minor, cumulative benefits for socioeconomics.

Conclusion. The prairie dog population that would result under Alternative C would be subject to population control on a case-by-case basis in the park, and would create long-term, negligible, adverse effects to socioeconomics. The use of landowner incentives or conservation easements and maintenance of wildlife viewing opportunities could produce long-term, negligible benefits to socioeconomics.

Effects of Alternative D – Low Acreage Target

Alternative D would manage for a population of 300 to 1,000 acres of prairie dogs in the park, representing a substantial drop from the current estimate of approximately 2,200 acres. The reduced prairie dog population in the park would concurrently reduce the incidence of prairie dogs encroaching on private lands that border the park. This would decrease the number of requests to the state for removal by the South Dakota Department of Game Fish and Parks, creating a long-term, minor, beneficial effect to socioeconomics.

As in Alternative A, visitors would continue to have the opportunity to view prairie dogs via pullouts throughout the park. The low population numbers anticipated in Alternative D, however, could diminish the ease of readily sighting prairie dogs as well as associated species making use of the prairie dog towns. This would potentially adversely affect the park's wildlife-viewing visitors and lead to slightly reduced visitation over time. However, this potential adverse effect on socioeconomics would be negligible.

Cumulative effects. As in Alternative A, the South Dakota Black-tailed Prairie Dog Conservation and Management Plan would eliminate the financial hardship of private landowners funding prairie dog removal, if any prairie dogs were to disperse from the park to their adjacent land. This plan would create long-term, minor to moderate, beneficial effects to socioeconomics, for adjacent landowners. Landowners not adjacent to the park would still bear some financial burden, if prairie dogs from the park were to immigrate to their land. The low population numbers anticipated from implementation of Alternative D would so greatly reduce the incidence of prairie dogs emigrating from the park that this alternative would enhance the effects of the state plan, resulting in long-term, moderate, beneficial, cumulative effects to socioeconomics.

Conclusion. The low population of prairie dogs in the park would decrease the socioeconomic effects of encroachment onto private land and produce a long-term, minor, beneficial effect to socioeconomics. The potential use of incentives and easements for landowners, to create prairie dog habitat, could result in long-term, negligible, beneficial effects. The reduced number of visible prairie dogs may ultimately affect visitation although this potential long-term, adverse effect would be negligible.

ETHNOGRAPHIC RESOURCES

Affected Environment

During and shortly before the time of Euroamerican exploration and settlement, the Wind Cave area was used by a number of tribes.

A number of American Indian tribes have aboriginal, historical, and cultural ties to the land within the Black Hills, which includes Wind Cave. These tribes include: Apache Tribe of Oklahoma, Arapaho Business Committee, Cheyenne-Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Crow Creek Sioux Tribal Council, Flandreau Santee Sioux Executive Committee, Fort Belknap Community Council, Fort Peck Tribal Executive Board, Lower Brule Sioux Tribal Council, Northern Cheyenne Tribal Council, Oglala Sioux Tribal Council, Ponca Tribe of Nebraska, Ponca Tribe of Oklahoma, Rosebud Sioux Tribal Council, Rosebud Sioux Tribe, Santee Sioux Tribal Council, Sisseton-Wahpeton Sioux Tribal Council, Standing Rock Sioux Tribal Council, Standing Rock Sioux Tribe, Three Affiliated Tribes Business Council, and Yankton Sioux Tribal Business and Claims Committee.

Wind Cave National Park's recorded archeological resources clearly indicate that areas in and around the park were locations where people lived and hunted for many centuries. There are numerous prehistoric archeological sites within the park, and many American Indians have concerns about the preservation and protection of these types of cultural sites.

The Black Hills occupy a very special place in the history, creation stories, and religious beliefs of these groups. Centuries-old American Indian stories tell of a "hole that breathes cool air" near the Buffalo Gap (NPS 2005d). This "wind" cave was regarded by Lakota peoples as the site of their origin, and they have many stories about the role the cave played in their culture. Many of the common tribal names for the area describe the landscape or special activities associated with the area. Tribes' sacred names for the Black Hills convey something more essential and

fundamental about a peoples' relationship to the region: they suggest an intimacy born out of a deep knowledge and experience of the Hills, one created by peoples who had lived there and been nourished by their presence (Albers 2003).

A study of the history of tribal and European American occupancy of the Black Hills and adjacent areas has helped to clarify and document tribes' relationship to the park and its resources (Albers 2003). Various natural resources within the park were valued historically by tribes, and continue to occupy a special place within their belief systems and cultural traditions.

American Indians carefully observed prairie dog behavior and habitat, noting that:

Prairie dogs were known as 'little farmers,' for they cleared the ground about their dwelling places and soon after there began to grow a plant upon which they lived....The deserted towns of the prairie-dog seemed to be refertilized...for they soon were covered with grass...(Albers 2003).

Some tribes linked the prairie dog to cultivation while others associated them with herbal medicine, both from the plants such as the fetid marigold (*Dyssodia papposa*) that grow in prairie dog towns, and from the clean soils brought up from underneath the earth that contain purifying and healing properties. These soils also may have cultural importance in religious activities and beliefs because of their association with the subterranean or underworld. Pulverized soils brought to the surface by prairie dogs also may contain minerals of widespread ceremonial importance (Albers 2003). The black-footed ferret, closely associated with the prairie dog, was thought to favor spurge (snow-on-the-mountain, *Euphorbia marginata*), a plant believed to grow in the vicinity of prairie dog towns.

Natural resources in the park are significant to tribes, not because they are rare and do not appear elsewhere, but because of the overall character of the area where they are located. That is, the animals, plants, soils, and stones associated with the places where tribes believe humans and bison (animals who represent the entire cosmos) emerged to populate the earth are likely to be seen as especially sacred (Albers 2003).

Prairie dogs served other uses as well. They were historically used as food and their bones for manufacturing tools and weapons. These animals occupy a very special place in American Indian history and belief systems.

Effects of Alternative A – the No Action Alternative

Prairie dogs compete with other animals for forage, and increases in colony size and areas occupied can reduce the amount of forage available for some other species, especially those ungulates whose ability to move out onto the forest or grasslands is limited by the park fences. On the other hand, prairie dogs provide valuable food for species such as raptors, coyotes, badgers, and other predators, and maintaining existing colonies would benefit these animals and birds, some of which are valued by tribes (Albers 2003).

Under this alternative prairie dogs that move into developed areas of the park would be live trapped and relocated into areas receiving less public use.

Mowing would continue in prairie dog colonies. By removing competitive exotic plants, traditionally used native plants associated with prairie dog towns could benefit.

As discussed for wildlife (above) continuation of existing conditions would have long-term, negligible, adverse effects on other wildlife species such as elk that compete for forage resources, especially during periods of drought. Alternative A would have a long-term, minor to moderate benefit on other species dependent on the prairie dog and its habitats, including benefits to native plants. Thus this alternative would have both beneficial (long term, minor to moderate) and adverse (long term, negligible) impacts on ethnographic resources valued by tribes.

Cumulative Effects. Many changes have occurred to the natural environment of the western United States over the past two or three centuries. Huge bison herds were decimated, and prairie dogs eradicated from thousands of acres of prairie. Thousands more acres were converted to farmland or were developed for cities, highways, and industrial uses that are incompatible with the continued growth and well-being of many native plants and animals valued by tribes. The cumulative effect upon ethnographic resources has been long term, moderate, and adverse.

The protection and management of bison and prairie dogs and other species in national parks such as Wind Cave National Park have helped to maintain the traditional ties American Indians have with the earth and its plants and animals. Proposed park plans, including a bison management plan, fire management plan, elk management plan, and vegetation management plan all look for ways to benefit park resources and maintain a healthy ecosystem. As the park's resources benefit, so do the ethnographic resources valued by tribes.

Outside of the park, losses in prairie dog habitat and populations would continue and would be likely to increase as population demands increase. The No Action Alternative would have a long-term, minor, beneficial cumulative effect on resources within the park valued by tribes (such as prairie dogs, associated plants and soils, and their ecosystem), but when combined with long-term, moderate adverse effects of actions outside of the park upon resources valued by tribes, the resulting cumulative benefit would be negligible.

Conclusion. Continuation of existing conditions would have long-term, negligible to minor, adverse effects on other ethnographically valued wildlife species such as bison that compete for limited forage resources, especially during periods of drought. Conversely, Alternative A would have a long-term, minor benefit on species dependent on the prairie dog and its habitats, including benefits to native plants. Thus, this alternative would have both beneficial (minor to moderate) and adverse (negligible) impacts on ethnographically valued resources.

Alternative A would not produce major adverse impacts on ethnographic resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of ethnographic resources or values as a result of the implementation of Alternative A.

Effects of Alternative B – High Acreage Target

This alternative would encourage expansion of prairie dog colonies from the current level of approximately 2,200 acres to between 3,000 and 5,000 acres. A prairie dog population of this size could probably support a sustainable reintroduced population of black-footed ferret, which would be a minor benefit to ethnographic resources.

Increases in the number of prairie dog colonies could result in increases in exotic plants in some areas. However, with exotic plant control measures, native plants traditionally associated with prairie dog colonies would have an opportunity to thrive. Prairie dog population control measures could include use of zinc phosphide which could potentially affect other wildlife species. However this use would likely be confined to the Active Management Zone and the No Prairie Dog Zone. The infrequency of use would cause only negligible, short-term adverse effects on ethnographically valued species.

Effects the increased prairie dog population could have on bison would range from minor to moderate and would be long term and adverse.

Prairie dogs and wildlife species that depend on prairie dogs and the habitats they create would benefit from the implementation of this alternative.

Alternative B would have both long-term, beneficial minor effect and long-term, adverse negligible to moderate effects on ethnographic resources valued by tribes.

Cumulative effects. Past cumulative effects for this alternative would be the same as described for Alternative A, but the increased populations of prairie dogs could create future resource problems, including competition, overgrazing areas and diminished viability of culturally important plants and species that depend upon them, representing a long-term, minor to moderate, adverse effect. When this future outcome is added to past cumulative adverse impacts, cumulative effects would be long-term, adverse, and moderate.

Conclusion. Alternative B would have long-term, beneficial minor effects and long-term, adverse negligible to moderate effects on ethnographic resources valued by tribes.

Alternative B would not produce major adverse impacts on ethnographic resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of ethnographic resources or values as a result of the implementation of Alternative B.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Under Alternative C, prairie dog colonies would occupy between 1,000 and 3,000 acres. A prairie dog population of this size could potentially support a reintroduced population of the black-footed ferret, which, if the population was reintroduced, would result in a long-term, minor benefit to ethnographic resources.

As in Alternative B, exotic plant control would allow regrowth of native vegetation, including plants valued by tribes, within prairie dog towns. A No Prairie Dog Zone would be placed around developed areas of the park, and control measures described above would be implemented if the populations increased beyond the proposed limits; effects would be long term, moderate, and beneficial.

Wildlife species that depend on prairie dogs and the habitats they create would benefit from implementation of this alternative. Some of these species could be affected by use of zinc phosphide, a short-term and negligible to minor adverse effect.

Effects to bison would be long term, negligible to minor, and adverse due to competition for forage.

Cumulative Effects. Alternative C would have a long-term, moderate, beneficial, effect on resources within the park valued by tribes (such as prairie dogs, associated plants and soils and their ecosystem) by maintaining an ecological balance in species habitat. When these effects are combined with the minor adverse effects of ongoing and future actions outside of the park, the resulting cumulative impact would be minor, beneficial, and long term.

Conclusion. Beneficial effects of Alternative C on ethnographic resources would be long term and moderate because the potential for a reintroduced population of black-footed ferret would exist, regrowth of native vegetation considered ethnographically important would be supported, and wildlife species who depend on prairie dogs and the habitats they create would benefit. Effects to bison would be long term, negligible to minor, and adverse due to competition for forage.

Alternative C would not produce major adverse impacts on ethnographic resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of ethnographic resources or values as a result of the implementation of Alternative C.

Effects of Alternative D – Low Acreage Target

Under Alternative D, the acreages of prairie dog colonies within the park would be reduced from their present level of approximately 2,200 acres to a range of 300 to 1,000 acres. This alternative would limit the important influence that prairie dogs have on the park's mixed-grass prairie communities and would reduce the numbers of animals and the amounts of special soils and minerals valued by tribes. Wildlife species that depend upon prairie dogs and the habitats they create would be adversely affected, with a corresponding adverse effect on ethnographic resources such as raptors and other predators. Zinc phosphide use could potentially affect traditionally-valued wildlife species, a short-term, negligible to minor, adverse effect.

Under this alternative, the large-scale reduction in prairie dog populations in the park would, over the short-term, increase forage for ungulates. However, there is a long-term symbiotic relationship between prairie dogs and bison. Prairie dogs tend to fertilize and improve soils

which, in turn increase the nutrition available for plants in the vicinity. Over the long term, plants that are associated with the prairie dog towns would not have the benefit of the enriched soils and might fail to thrive, resulting in reduction of this ethnographic resource. The reduction in enriched soils also could reduce the potential for the best possible bison grazing in the future, and lead to reduced herd vitality, a long-term, negligible, adverse impact.

Cumulative Effects. Cumulative impacts based on past history in the area would be the same as described for Alternative A. Reductions of the number of prairie dog acres in the park to the level proposed in this alternative would negatively affect the past and present conditions in the broader area and would have a minor cumulative adverse effect on ethnographic resources, now and in the future.

Conclusion. Implementation of Alternative D would have a long-term, negligible, adverse impact on ethnographic resources because reduced prairie dog populations would affect ethnographically valued plant and animal species that are dependent upon them and decrease the amount of soil tilling and fertilization that, over the long term, would benefit bison, a species that is highly valued by American Indians.

Alternative D would not produce major adverse impacts on ethnographic resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of ethnographic resources or values as a result of the implementation of Alternative D.

PARK OPERATIONS

Affected Environment

Park operations, for the purpose of analysis, refers to the quality and effectiveness of maintaining the park's infrastructure, to ensure adequate protection of vital resources and provide for an effective visitor experience. Park operations are not considered a resource that is protected by the Organic Act. Therefore, park operations do not warrant consideration for impairment.

Wind Cave National Park has 41 onsite personnel who provide the full scope of functions and activities to accomplish management objectives and meet requirements in law enforcement, emergency services, public health and safety, science, resource protection and management, visitor services, interpretation and education, community services, utilities, housing, fee collection, and management support.

The resource management group conducts prairie dog monitoring, including mapping the colonies using GPS, throughout the entire park. They also live trap and relocate prairie dogs and conduct range productivity transects.

Fire management is conducted throughout the park, according to the management prescriptions set forth in the Wind Cave National Park Fire Management Plan (1999b).

Some prairie dog colonies are currently mowed by maintenance staff to prevent expansion of exotic species, such as thistle.

Effects of Alternative A – the No Action Alternative

Alternative A would continue current park operations regarding prairie dog management. Continuing current prairie dog monitoring, live trapping and relocation, and mowing prairie dog colonies would not change from current park operations and represent a negligible to minor adverse impact on park operations as a result of the time and effort that is needed to perform the management activities associated with prairie dogs.

With a potential of 8,566 acres of prairie dog towns in the park, the number and location of exotic plant species infestations may increase, requiring additional expenditures for staff, supplies and equipment needed to control these species and would result in long-term, minor to moderate adverse impacts on park operations.

Time taken to respond to landowner concerns about prairie dogs is time well spent and important but could affect the ability of the resource management staff to work on other aspects of park operations. Responding to landowner concerns about prairie dogs as a result of continuing current management would result in a long-term, negligible to minor, adverse effect on park operations.

Cumulative effects. The other plans and projects, including the natural resource management plans currently in preparation and infrastructure projects, would likely result in moderate, long-term, beneficial effects to park operations as they would improve management of park facilities and resources. The No Action Alternative would make no contribution to these effects.

Conclusion. Prairie dog management activities and time responding to landowner concerns about prairie dogs as a result of continuing current management would result in a long-term, negligible to moderate, adverse effect on park operations.

Effects of Alternative B – High Acreage Target

Alternative B would result in an increase in park operations regarding prairie dogs, through the expansion of the existing prairie dog population. Also, the Active Management Zone would require additional park staff time in terms of monitoring and responding to landowner concerns about prairie dogs leaving the park. With the Active Management Zone in place, more time would be budgeted to responding to landowner concerns about prairie dogs. Staff time for contacting organizations to help with conservation easements and landowner incentives would also be needed. Adding the management tools of shooting by park staff and zinc phosphide control would require additional training and labor.

With 5,000 acres of prairie dog towns in the park, the number and location of exotic plant species may increase, possibly requiring additional expenditures for staff, supplies and equipment needed to control these species.

These changes in prairie dog management and staff needs would have a long-term, minor to moderate adverse effect on park operations in Wind Cave National Park. Additional time, training, costs, and materials may be needed to complete the above mentioned actions (*i.e.*, zinc phosphide poisoning and exotic plant control).

Cumulative effects. The long-term, moderate, cumulative benefits of the park's infrastructure improvement projects and resource management plans would be offset by the adverse effect on park operations of Alternative B. Cumulatively, Alternative B and the other related plans and projects would result in long-term, minor to moderate, beneficial effects to park operations.

Conclusion. Because of the increased need for control in the Active Management Zone and activities needed to encourage prairie dog colony expansion, Alternative B would have a long-term, minor to moderate, adverse effect on park operations.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Alternative C would maintain prairie dog colonies in the park between 1,000 and 3,000 acres. Although there is no active management zone, landowners that contact the park in regard to prairie dogs would require additional park staff time. Staff time for contacting organizations to help with conservation easements and landowner incentives would also be needed. Adding the management tools of shooting by park staff and zinc phosphide control would require additional training and labor.

With 3,000 acres of prairie dog towns in the park, the number and location of exotic plant species may increase. This may require additional expenditures for staff, supplies and equipment needed to control these species.

Because Alternative C would be similar to current conditions in terms of park operations, with the addition of newly available management tools, there would be a long-term, negligible to minor, adverse effect on park operations.

Cumulative effects. Other plans and projects include moderate, long-term benefits of infrastructure projects in the park. Alternative C would make a negligible to minor, adverse, long-term effect on park operations. Cumulatively, these projects would result in minor to moderate, long-term, beneficial effects to park operations.

Conclusion. The effects of Alternative C would be similar to those of the No Action Alternative, with the exception of additional management tools, which would require additional staff time. Effects of Alternative C would be long-term, negligible to minor, and adverse.

Effects of Alternative D – Low Acreage Target

Alternative D would result in an increase in demand on park operations for reducing prairie dog numbers. Implementing prairie dog control actions on the scale needed to reach the 300 to 1,000 acre colony size target would result in moderate, adverse, and long-term effects on park operations as a result of the added staffing and costs associated with reduction of the prairie dog

population. Landowner concerns would not likely require additional time, as the reduced prairie dog population would likely minimize landowner complaints.

With 1,000 acres of prairie dog towns in the park, the number and location of exotic plant species may decrease over time. This could result in a decreased need for expenditures for staff, supplies and equipment needed to control these species.

Cumulative effects. Cumulative effects of Alternative D would be similar to those described for Alternatives B and C, although Alternative D may offset benefits of other plans and projects to park operations slightly more because of the intensity of the prairie dog control actions needed to achieve target acreage levels.

Conclusion. Because Alternative D would involve a large amount of staff time for extensive prairie dog control efforts, even though there would be less time needed to respond to landowner complaints, effects on park operations would be long term, moderate, and adverse.

VISITOR USE AND EXPERIENCE

Affected Environment

The National Park Service is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks. Visitor use and experience is not considered a resource that is protected by the Organic Act. Therefore, visitor use and experience does not warrant consideration for impairment.

Part of the purpose of Wind Cave National Park is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreation opportunities.

The park is one of a variety of destinations for visitors to the Black Hills. The primary attraction of the park is the cave, which includes more than 117 miles of (known) cave passage. However, most repeat visitors spend their time enjoying the surface features of the park (Farrell pers. comm. 2005b).

From 1993 to 2003, Wind Cave National Park received on average 767,458 visitors per year. This indicates an increase of 337,092 visitors in the decade (NPS 2005a). The park's public use reporting and counting instructions were changed in 1993, and again in 1994, to provide more accurate estimates of park use. Monthly recreation visits in 2004 reflect the normal pattern of visitor use for the park (see Figure 7). Peak visitation occurs from May to September, with the park hosting 134,552 visitors in July and 127,127 in August. November through February is traditionally the lowest use period for the park, with a monthly average of 16,815 visitors (based on data from 2001 to 2004).

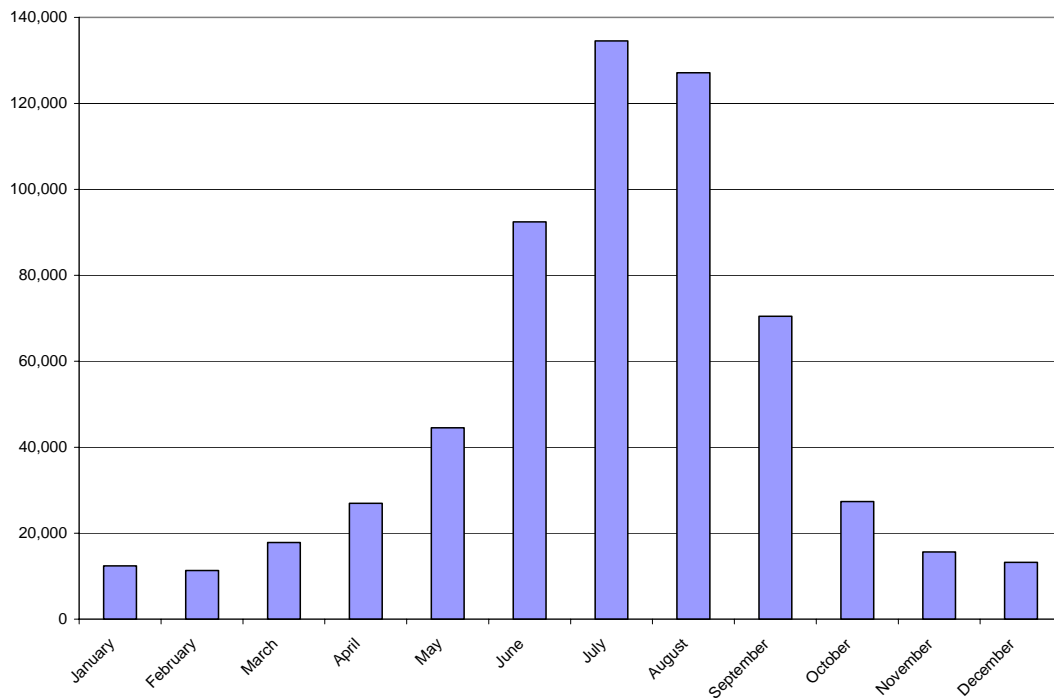


FIGURE 7. 2004 NUMBER OF RECREATION VISITS BY MONTH TO WIND CAVE NATIONAL PARK

Wind Cave National Park offers many activities for its visitors, including caving, hiking, observing wildlife, camping, picnicking, scenic driving, and interpretive tours. There are eight designated interpretive pullouts along the highways. Eleven different trail systems allow hikers to enjoy the park's backcountry. The park provides one picnic area and one campground (Elk Mountain Campground), which has 75 campsites and is well-used during the summer.

Interpretive rangers offer a campfire program in the summer and lead nature walks in the prairie which include informative discussions on the natural resources and history of the park. Watching wildlife is an integral part of the visitor experience at Wind Cave National Park; bison, elk, pronghorn, mule deer, coyotes, and prairie dogs can frequently be seen throughout the park.

Prairie dogs can be commonly sighted in the vast prairie areas of the park and provide a popular wildlife-viewing experience for visitors. The park staff is developing a new system of wayside informational panels, one of which contains content specific to prairie dog colonies and includes information about the role of prairie dogs in the grassland ecosystem. The wayside also includes warnings for the public to refrain from approaching or feeding prairie dogs.

Though there is currently no interpretative program focused solely on the prairie dog populations within the park, rangers often discuss the importance of prairie dogs in the park's ecosystem during other interpretive presentations (Farrell pers. comm. 2005a). Rangers leading interpretive hikes across the prairie will often discuss prairie dog ecology during their presentation.

Effects of Alternative A – the No Action Alternative

Under the No Action Alternative, the park would continue current management of prairie dogs, using live traps to relocate prairie dogs from developed areas in the park where they are unwanted. Continued access to relatively easy viewing of prairie dogs and their activities would create long-term, negligible, beneficial effects on visitor use and experience.

Cumulative effects. The park is in the process of upgrading old wayside exhibits, as well as adding new exhibits along Highway 385 and Highway 87. This action, in itself, would have a long-term, moderate, beneficial effect on visitor use and experience by allowing visitors increased opportunities to learn more about park resources and values and by presenting a consistent interpretive message. When combined with the long-term, negligible benefits of the No Action Alternative, the cumulative effects on visitor use and experience would be beneficial, long term, and minor to moderate.

Conclusion. Continuing to ensure the ease of viewing prairie dogs and their activities would result in short-term, negligible benefits to visitor use and experience.

Effects of Alternative B – High Acreage Target

The increase of prairie dog colony acreage under Alternative B would increase the wildlife-viewing opportunities for park visitors who wish to see prairie dogs and the species that are associated with prairie dogs. This would result in long-term, minor to moderate, beneficial effects on visitor use and experience.

Lethal control actions would be limited under this alternative and they would likely be implemented with little effect on visitor use and experience. The use of lethal controls involves the potential for some visitors to inadvertently see or hear the management activities taking place. For those visitors who do not understand or support the use of active population management (lethal or non-lethal) by the National Park Service, witnessing management activities may be offensive. This would result in short-term, negligible, adverse effects on the visitor experience. Control activities may also temporarily restrict access to some areas, resulting in a short-term, negligible to minor, adverse effect on visitor use and experience.

Wind Cave National Park has one of the few remaining high quality remnants of mixed-grass prairie in the northern Great Plains. If prairie dogs expand into 5,000 acres of potential habitat, they would occupy 30 percent of park rangelands.

Mowing would be available for use as a management tool, and may be used to increase the prairie dog population in conjunction with vegetation management activities. This would create short-term, negligible to minor, adverse effects.

Cumulative effects. The cumulative effects of other plans and projects that would affect visitor use and experience would be similar to those described for Alternative A. Alternative B would contribute to the beneficial effects of other plans and projects with additional long-term, minor, beneficial effects, due to increased visibility of prairie dogs in their natural habitat.

Cumulatively, the effects that would be anticipated from these actions would be beneficial, long-term, and minor, due to the short-term adverse effects of some elements of Alternative B.

Conclusion. The increased population of prairie dogs would enhance wildlife-viewing opportunities for park visitors and would result in long-term, minor to moderate, beneficial effects on visitor use and experience. The effects of various population control activities on the visitor experience could be adverse, short-term, and negligible to minor.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

The effects to visitor use and experience under Alternative C would be similar to those anticipated in Alternative B, although the intensity of effect would be marginally less. As described for Alternative B, effects on visitor use and experience resulting from use of lethal or non-lethal controls would be limited, but visitors could inadvertently witness management activities. Mowing would likely be used to a lesser degree than in Alternative B, because the prairie dog population would be limited. The use of prairie dog population control methods would result in short-term, negligible to minor, adverse effects on visitor use and experience.

Wildlife-viewing opportunities for park visitors would be relatively similar to existing conditions and would result in long-term, minor, beneficial effects on visitor use and experience.

Cumulative effects. Cumulative effects of Alternative C would be similar to those described for Alternative B, although slightly less beneficial because of the reduction in prairie dog colony acreage.

Conclusion. Effects on the visitor experience resulting from population control activities would be short-term, negligible to minor, and adverse. Wildlife-viewing opportunities would be similar to those under the No Action Alternative and would produce long-term, minor, beneficial effects on visitor use and experience.

Effects of Alternative D – Low Acreage Target

Alternative D would represent a large reduction from the current colony acreage. The number of colonies would potentially be reduced to as few as three and the acreage reduction would be approximately 1,200 to 1,900 acres. Park staff would use the available management tools, including lethal control, to attain this population goal. The potential for visitors encountering temporary closures as a result of control activities taking place would increase. The likelihood of some visitors viewing or hearing lethal control activities also would potentially increase, due to the frequency of such activities to reach the acreage targets of this alternative. This would be dependent upon which prairie dog colonies would be controlled and the time of year that the activity would take place. These factors would represent a short-term, minor to moderate, adverse effect on visitor use and experience. The adverse effects of mowing on the visitor experience would be lower than in Alternatives B and C, because use of these tools would be comparatively limited. However, when they were used to redirect colony expansion, they would produce short-term, negligible to minor, adverse effects.

Visitors could also be affected by a reduction in prairie dog viewing opportunities throughout the park. Interpretative talks given by park rangers and park interpretive literature would have to explain the reason for so few acres of prairie dogs, in contrast to their historic, uncontrolled population levels, in response to visitor inquiries. A reduction in the visibility of prairie dogs in the park may diminish the quality of the visitor experience. This would create a long-term, minor adverse effect on visitor use and experience.

Cumulative effects. Interpretive waysides planned in the park would have a long-term, moderate, beneficial effect to visitor use and experience. However, this would be offset by the long-term, minor to moderate adverse effects of implementation of Alternative D. Cumulatively, these actions would result in long-term, minor, adverse effects on visitor use and experience.

Conclusion. The effects of the use of lethal population control measures on prairie dogs, and the reduced population of prairie dogs in the park would produce long-term, minor to moderate adverse effects on visitor use and experience, due to the reduced visibility of a desired wildlife-viewing resource, the potential negative visitor reaction to witnessing population control methods, and potential access restrictions during control actions.

PUBLIC HEALTH AND SAFETY

Affected Environment

The National Park Service strives to provide safe and healthful conditions for the visiting public and park employees. This encompasses a wide range of activities, including infrastructure function and condition, law enforcement services, wildlife management, and minimizing visitor conflict. For this analysis, public health and safety addressed the condition of the park and the effects of the proposed black-tailed prairie dog management plan on visitors and staff. Public health and safety is not considered a resource that is protected by the Organic Act. Therefore, public health and safety does not warrant consideration for impairment.

In general, prairie dogs present very little threat to the public. In some instances where visitors approach prairie dogs too close, prairie dogs may bite. However, in areas where visitors stop to view prairie dogs, there are signs warning people not to feed the animals. On ranger-led hikes, in evening programs, and in the park newsletter, visitors are informed of the dangers of confronting wildlife, including seemingly harmless prairie dogs (NPS 2004f).

All five prairie dog species in the United States can contract plague. If introduced to plague-infected prairie dogs, the public could be at risk of contracting plague, although the risk would be very low for those who do not have direct contact with prairie dogs or their burrows. However, sylvatic plague, also known as bubonic plague in humans, is not known in the black-tailed prairie dog populations in Wind Cave National Park or in the majority of South Dakota.

Management activities related to prairie dogs may present a threat to public health and safety. Zinc phosphide, a commonly-used rodenticide, can be lethal to humans. A single dose of 5 grams has the potential to be lethal. Zinc phosphide can be absorbed through abrasions in skin, ingestion, or inhaling dust (INCHEM no date).

Effects of Alternative A – the No Action Alternative

Under the No Action Alternative, the park would continue to employ non-lethal control measures in developed areas of the park, which would include live trapping and relocating prairie dogs to more appropriate areas. The continued efforts to relocate prairie dog colonies away from these areas would have a long-term, negligible, beneficial effect on public health and safety.

Adverse health and safety effects that would continue include the potential for injuries from park staff handling prairie dogs and generally being exposed to outdoor field hazards, such as insect bites, slip and fall hazards, and varying climatic conditions. These effects would be considered long term, negligible, and adverse. Although the risk of sylvatic plague transmission is generally a concern with prairie dog management, no effects to public health and safety are anticipated because sylvatic plague is not known to occur in the prairie dog populations within the park or in the majority of South Dakota.

Cumulative effects. Past, present, or reasonably foreseeable future projects within the park that would also affect public health and safety such as other resource management plans, rehabilitating the highway and other roads, and the fire management plan, would have short-term, adverse effects; however, in the long term they would have moderate, beneficial effects. The long-term, beneficial effects of the No Action Alternative would make a negligible contribution to the effects of these projects. Overall, effects of this project in conjunction with other projects in the park would be long-term, moderate, and beneficial. Implementation of the infrastructure-related projects within the park would have varying degrees of short-term safety risks, but these would all be mitigated individually for protection of public health and safety and Alternative A would not measurably contribute to overall effects.

Conclusion. Alternative A would continue to have long-term, negligible, beneficial effects and long-term, negligible, adverse effects on public health and safety. Beneficial effects would occur from continuing to relocate prairie dogs away from areas where they may pose health and safety risks. Adverse effects would result from the continued potential for injuries from park staff working in outdoor field conditions while implementing prairie dog management activities.

Effects of Alternative B – High Acreage Target

The integration of defined management zones (the No Prairie Dog Zone and the Active Management Zone) into this alternative would enhance the beneficial effects of the No Action Alternative because there would be identified zones where the park would monitor and ensure the absence of prairie dogs. These areas are primarily areas where the presence of prairie dogs may pose a risk to public health and safety or infrastructure stability. Therefore, Alternative B would have a long-term, minor, beneficial effect on public health and safety.

Under Alternative B, there would be long-term, negligible, adverse effects from potential injuries to staff during management activities from the handling of prairie dogs and generally being exposed to outdoor field hazards, such as insect bites, slip and fall hazards, and varying climatic conditions. Lethal control actions, including shooting and use of rodenticide, would be available under this alternative. Although there is inherent danger in the use of firearms, lethal reduction by shooting inside the park would only be conducted by NPS staff who would be firearms

certified as directed by NPS policies (Director's Orders 9 and 77) and specifically trained in wildlife sharpshooting. The Environmental Protection Agency's product registration label for the rodenticide zinc phosphide recognizes the toxicity as category I for oral or inhalation (the highest of four categories), toxicity category III (the second lowest of four categories) for dermal exposure, and toxicity category IV (the lowest of four categories) for eye irritation (USEPA 1998). Therefore, individuals mixing, loading, or applying this rodenticide must take care in handling the chemical, specifically with regard to inhalation during application. The EPA states that by following the product's label instructions and wearing adequate personal protective equipment (including long-sleeve shirt and pants, shoes and socks, chemical-resistant gloves made of any waterproof material, and a dust/mist filtering respirator for mixers and loaders), adequate worker protection is provided (USEPA 1998). Therefore, effects from the use of lethal controls on public health and safety under Alternative B would be considered long-term and adverse. The effects would be of negligible intensity because these lethal population-reducing tools would not often be necessary because of the high acreage target associated with this alternative.

Cumulative effects. Similar to Alternative A, other past, present, or reasonably foreseeable future projects within the park would have long-term, moderate, beneficial effects. The long-term, beneficial effects of Alternative B would make a small contribution to the effects of these projects. Overall, effects of this alternative in conjunction with other projects in the park would be long-term, moderate, and beneficial. Implementation of the infrastructure-related projects within the park would have varying degrees of short-term safety risks, but these would all be mitigated individually for protection of public health and safety and Alternative B would not measurably contribute to overall effects.

Conclusion. Alternative B would have long-term, minor, beneficial effects from implementing prairie dog management activities in defined, monitored zones. This alternative would also have long-term, negligible, adverse effects on public health and safety. These effects would result from the continued potential for injuries from park staff working in outdoor field conditions while implementing prairie dog management activities. Long-term, negligible, adverse effects would also be present due to the potential for use of lethal population-reducing tools.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

The implementation of Alternative C would result in effects similar to those described for Alternative B. Alternative C would have a long-term, minor, beneficial effect on public health and safety from the integration of a defined management zone (the No Prairie Dog Zone) and population control in areas that may pose health and safety risks.

Alternative C would also have long-term, negligible, adverse effects from potential injuries to staff during management activities from the handling of prairie dogs and generally being exposed to outdoor field hazards.

Effects on public health and safety from the use of lethal control tools would be the same as described above for Alternative B; however, if prairie dog colonies continued to expand as a result of drought conditions, the intensity of effects could be slightly increased with Alternative C's moderate acreage target. The use of lethal, population-reducing tools may become more

necessary if this were to occur. Therefore, the implementation of Alternative C would have the potential for long-term, minor, adverse effects on public health and safety.

Cumulative effects. Similar to Alternatives A and B, other past, present, or reasonably foreseeable future projects within the park would have long-term, moderate, beneficial effects. The long-term, beneficial effects of Alternative C would make a small contribution to the effects of these projects. Overall, effects of this alternative in conjunction with other projects in the park would be long-term, moderate, and beneficial. Implementation of the infrastructure-related projects within the park would have varying degrees of short-term safety risks, but these would all be mitigated individually for protection of public health and safety and Alternative C would not measurably contribute to overall effects.

Conclusion. Alternative C would have long-term, minor, beneficial effects from implementing prairie dog management activities in a defined zone. This alternative would also have long-term, minor, adverse effects on public health and safety. These effects would result from the continued potential for injuries from park staff working in outdoor field conditions and the potential for use of rodenticide and shooting as population-reducing tools.

Effects of Alternative D – Low Acreage Target

Alternative D would have a long-term, minor, beneficial effect on public health and safety from the integration of a defined management zone (the No Prairie Dog Zone) and population control in areas that may pose health and safety risks.

The adverse effects of Alternative D would be the same as those described for Alternative C but with increased intensity. The low acreage target associated with this alternative would very likely necessitate an initially increased magnitude of rodenticide use or shooting to control the prairie dog population which could lessen over time as the population was reduced. Effects on public health and safety from the use of lethal controls would be long term, minor to moderate, and adverse.

Alternative D would also have long-term, negligible, adverse effects from potential injuries to staff while being exposed to outdoor field hazards.

Cumulative effects. Similar to effects described in the above alternatives, other past, present, or reasonably foreseeable future projects within the park would have long-term, moderate, beneficial effects. The long-term, beneficial effects of Alternative D would make a small contribution to the cumulative effects of these projects. Overall, effects of this alternative in conjunction with other projects in the park would be long term, moderate, and beneficial. Implementation of the infrastructure-related projects within the park would have varying degrees of short-term safety risks, but these would all be mitigated individually for protection of public health and safety and Alternative D would not measurably contribute to overall effects.

Conclusion. Alternative D would have long-term, minor, beneficial effects from implementing prairie dog management activities in a defined zone, and long-term, negligible, adverse effects from the continued potential for injuries from park staff working in outdoor field conditions.

There would also be long-term, minor to moderate, adverse effects from the use of rodenticide and shooting as population-reducing tools.

SOILS

Affected Environment

Eight soil associations are found in the southern Black Hills (Ensz 1990, NPS 2000b). Four of the associations are found within Wind Cave National Park: the Canyon-Rockoa-Rock Outcrop, the Nevee-Gypnevee-Reikop, the Vanocker-Sawdust-Paunsaugunt, and the Buska-Mocmont-Rock Outcrop. These silty and loamy soils were formed from weathered material derived from the underlying interbedded limestone, siltstone, shale, sandstone, gypsum formations and crystalline schists and granites exposed in the area. There are no prime or unique agricultural soils within the park.

Each soil association is related to the underlying geology, the landforms, relief, climate, and natural vegetation of a given area (Ensz 1990, NPS 1994a and 2000b). Similarly, each soil type provides some indication of the actual and potential distribution of wildlife and their habitat (Ensz 1990, NPS 2000b) as the underlying soils affect the kind and amount of vegetation that is available to wildlife as food and cover, as well as suitability for burrowing.

Research linking soils and black-tailed prairie dog habitat suitability have been conducted by Proctor *et al.*, the U.S. Forest Service, and the National Park Service (NPS 2004e). Based on the work of these researchers, Wind Cave National Park formulated a Potential Habitat Model to determine “potential” habitat that prairie dogs could occupy in the future (NPS 2004e). Based on the model, prairie dogs in the park generally seem to prefer flat, gentle slopes of less than 8 to 10 percent and deep (3-14 feet), silty, clayey or loamy soils that are not excessively rocky and well drained, yet capable of retaining water for burrow stability (NPS 2003). They also tend to select previously disturbed soils and avoid soils that are frequently flooded or excessively sandy and unable to support burrow systems (NPS 2004e, Munn 1993).

The prairie dog burrow system can be quite complex and extensive (City and County of Denver Animal Control no date, Kerscher no date). Tunnels are generally three to six feet below the surface and about 15 feet long, although burrows have been reported to reach depths of 15 feet. Mounds of excavated soil around the burrow entrance are generally cone-shaped and vary from one to three feet in height and from three to 10 feet in diameter. A typical colony will have 30 to 50 burrow entrances per acre. Kerscher (no date) cited evidence that prairie dogs can mix about 200 to 225 kilograms (about 441 to 496 pounds) of soil per burrow system.

Prairie dog effects on the underlying prairie soils include soil mixing, development, and enhancement and soil erosion (City and County of Denver Animal Control no date, Munn 1993, and Kerscher no date). By burrowing and digging, prairie dogs loosen soil, allowing precipitation to be absorbed into the soil more efficiently, reducing runoff. Kerscher’s literature review indicated that prairie dogs actively maintain their mound soils by enhancing soil texture and composition and maintaining the mound structure. Prairie dogs create a mix of soils by bringing heavier subsoils to the surface. This creates a heavy mix of soils that do not readily blow away in the wind. Through foraging, prairie dogs decrease vegetation height around the burrow systems creating increased plant growth at lower levels. This helps to maintain vegetative cover, which

further reduces wind and water surface erosion. Prairie dogs also change soils chemically (NPS 2004, City and County of Denver Animal Control no date, Munn 1993, and Kerscher no date) by adding nutrients to the soil or enhancing soil chemistry. Kerscher and Munn have cited research that suggests that the pH level and concentrations of calcium, magnesium, bicarbonates, nitrates, phosphorous, and organic content through addition of fecal and litter matter and carcasses, in soil has been altered through prairie dog activities.

Effects of Alternative A – the No Action Alternative

Continuing current management of the black-tailed prairie dogs in Wind Cave National Park would allow the black-tailed prairie dog to continue its role as an agent in soil formation and enhancement and erosion control in the ecosystem it inhabits. The continued presence of prairie dog colonies would maintain these long-term, negligible to minor, beneficial effects on soils within the park.

If prairie dogs expand into all potential habitat, and these acres trend from late intermediate to an early intermediate or early seral stage, the potential for wind erosion may increase during drought. This would be due to an increase in bare ground associated with drought and early seral stage development within the plant community. However, prairie dogs also bring heavier soils to the surface and increase infiltration, which results in reduced water erosion. Adverse effects of prairie dogs on soil erosion would continue to be negligible.

Cumulative effects. Alternative A would contribute negligible to minor beneficial effects to the soil resources in Wind Cave National Park. Upcoming completion of infrastructure projects, such as the rehabilitation of Highway 87 and visitor center access roads and rehabilitation of the wastewater treatment system, include localized, minor levels of soil disturbance and compaction associated with construction activities that would have no long-term effects to soil resources once rehabilitation activities have been completed. Long-term, negligible, adverse effects would occur where surface structures cover soil resources such as in new pavement or building structures.

Long-term, negligible to minor, beneficial effects to soil resources would occur through implementation of the various resource management plans, such as bison and elk management plans, as soil formation and stabilization processes would be enhanced from optimal grazing levels being set. Implementation of the fire management plan would contribute negligible to minor, beneficial effects on soil resources in that natural soil processes and formation would be enhanced or re-established through better management of the prairie vegetation.

The No Action Alternative would contribute to the beneficial effects, resulting in long-term, negligible to minor, beneficial effects on the park's soil resources through soil resource augmentation, enhancement, and erosion control resulting from prairie dog activities.

Conclusion. Alternative A would continue to have long-term, negligible to minor, beneficial effects to soil resources as the prairie dog would continue its role as an agent in soil mixing, formation, and enhancement, and erosion control.

Alternative A would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation

of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's management plan or other National Park Service planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative A.

Effects of Alternative B – High Acreage Target

Alternative B would manage for a black-tailed prairie dog population between 3,000 and 5,000 acres. This alternative would encourage the black-tailed prairie dog to expand its role as a soil mixing, formation and enhancement and erosion control agent. Underlying soils associated with prairie dog colonies would experience a more intense negligible to minor, long-term benefit over a wider area under this alternative.

As discussed under management tools common to all action alternatives, one of the management tools being considered in this environmental assessment is poisoning prairie dogs using zinc phosphide. The EPA reports that zinc phosphide quickly degrades to phosphine and zinc ions, which adhere to soil and are thus relatively immobile (USEPA 1998). Use of zinc phosphide would therefore have a short-term, negligible, adverse effect to soil resources because it would quickly degrade into relatively immobile ions with no build-up if applied within guidelines.

If prairie dogs expand into the targeted acreage of potential habitat, and these acres trend from late intermediate to an early intermediate or early seral stage, the potential for wind erosion may increase during drought. This would be due to an increase in bare ground associated with drought and early seral stage development within the plant community. However, prairie dogs also bring heavier soils to the surface and increase infiltration, which results in reduced water erosion. Effects of prairie dogs on soil erosion would continue to be negligible.

Cumulative effects. As discussed above, other park construction and improvement plans have generated or would generate minor amounts of short- and long-term soil disturbance in the park. These sites would be rehabilitated and revegetated once construction activities are completed. Other projects and plans affecting natural resources, such as the bison and elk management plans and the fire management plan would be anticipated to have long-term, negligible to minor benefits on soils. The effects of Alternative B on soils (long term, negligible to minor, beneficial), in combination with other existing or proposed actions, would be negligible to minor, long term, and beneficial.

Conclusion. Alternative B would have long term, negligible to minor, beneficial effects to soil resources and would be felt over a wider area where prairie dog colony expansion has occurred. Short-term, adverse effects from the use of zinc phosphide would be negligible.

Alternative B would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's management plan or other National Park Service planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative B.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Alternative C would maintain a prairie dog colony acreage in the park between 1,000 and 3,000 acres. This alternative would allow the black-tailed prairie dog to continue its role as a soil mixing, formation and enhancement and erosion control agent. Underlying soils associated with prairie dog colonies would experience a negligible to minor, long-term benefit within the narrower range under this alternative.

Adverse effects to soil resources associated with the use of zinc phosphide would be similar to those described for Alternative B.

If prairie dogs expand into all the targeted acreage of potential habitat, and these acres trend from late intermediate to an early intermediate or early seral stage, the potential for wind erosion may increase during drought. This would be due to an increase in bare ground associated with drought and early seral stage development within the plant community. However, prairie dogs also bring heavier soils to the surface and increase infiltration, which results in reduced water erosion. Effects of prairie dogs on soil erosion would continue to be negligible.

Cumulative effects. The cumulative effects of Alternative C would be similar to those described for Alternative B, with an incremental decrease in the beneficial contribution of the action alternative to the benefit, but still resulting in a negligible to minor, long-term, and beneficial effect on soils.

Conclusion. Alternative C would have a long-term, negligible to minor, beneficial effect to soil resources. Short-term, adverse effects from the use of zinc phosphide would be negligible.

Alternative C would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's management plan or other National Park Service planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative C.

Effects of Alternative D – Low Acreage Target

Alternative D would reduce prairie dog colony acreage from their current level of approximately 2,200 acres to 300 to 1,000 acres. This alternative would limit the prairie dog role as a soil formation and enhancement and erosion control agent in the park. Underlying soils associated with prairie dog colonies would still experience a negligible to minor, long-term benefit but at less intense rates.

If prairie dogs inhabit between 300 and 1,000 acres of potential habitat, 1,200 to 1,900 acres of park rangelands (as a result of a reduction from the current 2,200 acres) may trend from early and early intermediate seral stages to late intermediate seral stage, which may result in a decreased potential for wind erosion. However, prairie dogs also bring heavier soils to the surface and increase infiltration, which results in reduced water erosion. Effects of prairie dogs on soil erosion would continue to be negligible.

As discussed under Alternatives B and C, the short-term, adverse effects associated with the use of zinc phosphide would be of negligible intensity.

Cumulative effects. The cumulative effects of Alternative D on soils would be similar to those described for Alternatives B and C.

Conclusion. Alternative D would have long-term, negligible to minor, beneficial effects to soil resources even though the role of the prairie dog would be reduced. Short-term, adverse effects from the use of zinc phosphide would be negligible.

Alternative D would not produce major adverse impacts on soil resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's management plan or other National Park Service planning documents. Consequently, there would be no impairment of soil resources or values as a result of the implementation of Alternative D.

WATER RESOURCES

Affected Environment

Wind Cave National Park is within the Niobrara River basin, which is part of the greater Missouri River watershed. Flow generally moves southeastward out of the park to join larger tributaries (USEPA 2002). Surface water at Wind Cave National Park is relatively scarce. There are four main drainages within the park: Beaver Creek, Highland Creek, Cold Springs Creek, and Wind Cave Canyon (NPS 1994a). Only Beaver Creek has a USGS gage. Both Beaver Creek and Highland Creek have adequate flow and water quality to support trout populations (Muenchau pers. comm. 2002).

The karst geology of the area plays an important role in the hydrology of the park. "Karst" is a landscape underlain by limestone that conducts groundwater well and is also gradually dissolved by the water it transports. Karst topography includes streams that may disappear and reappear due to the presence of subsurface channels (Cave Conservancy of the Virginias 1999). This is the case with Beaver and Highland Creeks, which both sink and disappear where they cross the Madison Limestone (Muenchau. pers. comm. 2002). It has been noted that surface flows in the park have declined over the past 60 to 70 years. This phenomenon is attributed to expansion of ponderosa pine forests, causing an increase in water use by vegetation, and reducing water available for runoff (NPS 1994a). The park contains several seeps and springs, with several used to provide a dependable water source, primarily for bison and elk (NPS 1994a).

Prairie dogs prefer soils that are deep, well drained, capable of retaining water for burrow stability, low slopes and with low vegetation (NPS 2003). Because of this preference for well-drained soils on low slopes, existing prairie dog colonies in the park often occur near ephemeral streams. Of the 16 colonies documented in 2004, seven have an ephemeral stream that runs through the colony, and two additional colonies are located near ephemeral streams. Four out of the six colonies that are larger than 100 acres have an ephemeral stream running through the colony (NPS 2004d).

Effects of Alternative A – the No Action Alternative

Research suggests that the presence of prairie dogs can decrease soil erosion in an area, thereby reducing sediment delivery to nearby water resources. This is in conflict with the common perception, often expressed in public comments during scoping, that prairie dog activities increase soil erosion. By burrowing and digging, prairie dogs loosen soil, allowing precipitation to be absorbed into the soil more efficiently, reducing runoff (City and County of Denver Animal Control no date). In a literature review of prairie dogs and erosion, Kerscher (no date) reviewed research that concluded prairie dogs actively maintain their mound soils by enhancing texture, composition, and maintaining the mound structure. By bringing heavier subsoils to the surface, prairie dogs create a mix of soils that is heavy and does not blow away readily in the wind. While prairie dogs decrease vegetation height, they also increase plant growth at lower levels, maintaining vegetative cover except on mounds (Kerscher no date). A number of studies from the 1930s through 1950s suggested that prairie dogs may be vital in creating and maintaining soils in the prairie (Kerscher no date). It is unlikely that prairie dog burrows would affect groundwater. Therefore, the continued presence of prairie dogs under the No Action Alternative would have long-term, negligible, beneficial effects to water resources.

Cumulative effects. Other plans being implemented in the park, such as the projects to rehabilitate Highway 87 and replace the park's wastewater treatment system and other resource management plans, would result in long-term, moderate, beneficial effects to water resources. These projects would have short-term, adverse effects from construction. The No Action Alternative would contribute negligible, adverse effects; however, overall cumulative effects to water resources in the park from all of these projects would be long-term, minor, and beneficial.

Conclusion. The No Action Alternative would have long-term, negligible, beneficial effects to water resources as a result of burrowing activities, loosening soil, and allowing more water to infiltrate instead of delivering runoff to streams.

Alternative A would not produce major adverse impacts on water resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of water resources or values as a result of the implementation of Alternative A.

Effects of Alternative B – High Acreage Target

Effects of Alternative B would be similar to those described above. Long-term, negligible, beneficial effects would occur from the presence of prairie dog colonies and their ability to decrease soil erosion to nearby water resources.

The EPA reports that zinc phosphide degrades rapidly to phosphine and zinc ions, which adhere to the soil (USEPA 2003). In addition, due to zinc phosphide's insolubility, it is also immobile in soil (APHIS 2003). It is for these reasons that the EPA concluded that zinc phosphide and its byproducts appear unlikely to contaminate groundwater and surface water (USEPA 2003). Therefore, short-term, adverse effects from the use of zinc phosphide would be negligible.

Cumulative effects. Other plans being implemented in the park would result in long-term, moderate, beneficial effects to water resources. These projects would have short-term, adverse effects from construction. Alternative B would contribute minor, adverse effects; however, overall cumulative effects to water resources in the park from all of these projects would be long-term, minor, and beneficial.

Conclusion. Alternative B would have long-term, negligible, beneficial effects to water resources as a result of burrowing activities and increased infiltration of runoff. The use of the rodenticide zinc phosphide would have short-term, negligible, adverse effects on water resources.

Alternative B would not produce major adverse impacts on water resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of water resources or values as a result of the implementation of Alternative B.

Effects of Alternative C – Mid-range Acreage Target – the Preferred Alternative

Effects of Alternative C would be similar to those described for Alternative B. Long-term, negligible, beneficial effects would occur from the presence of prairie dog colonies and their ability to decrease soil erosion to nearby water resources. Short-term, negligible, adverse effects would result from the use of zinc phosphide.

Cumulative effects. Other plans being implemented in the park would result in long-term, moderate, beneficial effects to water resources. These projects would have short-term, adverse effects from construction. Alternative C would contribute negligible to minor, adverse effects; however, overall cumulative effects to water resources in the park from all of these projects would be long-term, minor, and beneficial.

Conclusion. Alternative C would have effects similar to, but of a slightly lower intensity than Alternative B because of the reduced area of prairie dog colonies. Short-term, negligible, adverse effects would result from the use of zinc phosphide.

Alternative C would not produce major adverse impacts on water resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of water resources or values as a result of the implementation of Alternative C.

Effects of Alternative D – Low Acreage Target

Effects of Alternative D would be similar to those described for Alternative C, although the area of effect would be less because of the lower acreage target.

Cumulative effects. Other plans being implemented in the park would result in long-term, moderate, beneficial effects to water resources. These projects would have short-term, adverse effects from construction. Alternative D would contribute negligible, adverse effects; however, overall cumulative effects to water resources in the park from all of these projects would be long-term, minor, and beneficial.

Conclusion. Alternative D would have long-term, negligible, beneficial effects to water resources as a result of burrowing activities. Effects associated with the use of zinc phosphide would be similar to those described for Alternative C.

Alternative D would not produce major adverse impacts on water resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of water resources or values as a result of the implementation of Alternative D.

SUSTAINABILITY AND LONG-TERM MANAGEMENT

Sustainability is the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. The NPS Guiding Principles of Sustainable Design (1993) directs NPS management philosophy. It provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions.

The park's existing management of prairie dogs was based upon the 1982 Prairie Dog Management Plan and the subsequent general management plan (NPS 1994a) until the black-tailed prairie dog was proposed for listing. At that time, the park was precluded from controlling prairie dogs. When the black-tailed prairie dog was removed from the candidate list, the Midwest Regional Director instituted a policy whereby a current management plan was required before control activities could take place. Without updated scientific information by which to assess the accurate condition of the prairie dog population in the park, the goal of sustaining a viable prairie dog population may not be achieved. In section 4.4.2.1 of NPS *Management Policies 2001*, the National Park Service is directed to manage any activities for population control of natural resources in such a way to prevent interference with natural habitats, natural abundances, and the natural distributions of native species and natural processes. The black-tailed prairie dog was previously a candidate for listing as a threatened species by the U.S. Fish and Wildlife Service, and may be at risk of becoming listed again if management actions are not taken to ensure vital functioning populations in key locations such as national parks. The presence of prairie dogs is crucial to biodiversity and the continued presence of certain other species within the park.

The proposed action alternatives analyzed in this environmental assessment present a range of solutions for the park's prairie dog management needs. Alternatives B and C (managing for 3,000 to 5,000 and 1,000 to 3,000 acres, respectively) offer environmental benefits when compared to the unpredictable and unregulated No Action Alternative or Alternative D (which would manage for 300 to 1,000 acres of prairie dogs within the park). Alternative D may bring

the population to levels too low to sustain not only the black-tailed prairie dog, but other species using their habitat, should an unforeseen event threaten the health or habitat of the colonies.

Alternative C, the Preferred Alternative, would present the most sustainable, long-term option for prairie dog management.

The Preferred Alternative utilizes a moderate population target, a No Prairie Dog Zone, and a proactive policy to consult with neighboring landowners (on a case by case basis) who may object to prairie dogs migrating from the park. This alternative also includes the flexibility of access to all management tools, which is adaptive over time, based on the available scientific information.

For these reasons, implementation of the Preferred Alternative would conform to NPS policies mandating protection of park resources into perpetuity.

CONFLICTS WITH LAND USE PLANS, POLICIES, AND CONTROLS

Regulations and Management Constraints

The Organic Act directs the National Park Service to “conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for future generations” (16 USC 1). This Act sets resource conservation as the primary consideration of the National Park Service in all management considerations of park lands or resources.

NPS *Management Policies 2001* (NPS 2000a) requires that whenever actions taken by the National Park Service have the potential to affect the planning, land use, or development patterns on adjacent or nearby lands, the effects of these activities are also to be considered. NPS *Management Policies 2001* (NPS 2000a) also directs the National Park Service to protect natural resources from impacts caused by external activities by working cooperatively with federal, state, and local agencies, as well as adjacent landowners. However, this coordination of resource management goals and activities must be done in ways that protect and do not compromise park resources and values. For this reason, the plans of agencies with adjacent jurisdiction areas and the actions of neighboring landowners is described below, to illustrate that the proposed NPS action would not be in conflict with such external activities, nor would it compromise the viability of the prairie dog resources within the park. For this prairie dog management plan, any management activities would occur solely within the boundaries of the park and be conducted by National Park Service staff members.

Policies and Management Activities of Adjacent Agencies

Wind Cave National Park is surrounded by many privately owned parcels of land, as well as some public lands. Private land owners conduct prairie dog control activities independently on their own land, while the state and federal land managers operate within approved restrictions on control actions. Encroachment of prairie dogs into unwanted areas is a common concern

(evidenced by comments received during public scoping), although the evidence of migration and dispersal from the park to neighboring private lands is primarily based on anecdotal reports. There is one confirmed report of a prairie dog that had been radio collared inside of Wind Cave National Park during the summer of 2002 and was recovered on a ranch approximately 4 miles away (Roddy pers. comm. 2005b).

Currently, Wind Cave National Park implements little active prairie dog population control, except to address localized problems, such as small-scale trapping and relocation actions near the developed areas of the park. When the park receives complaints from neighboring landowners, park staff will communicate or meet with the neighbor to discuss the problem, but have been precluded from taking control actions. The government entities along the boundary of Wind Cave National Park are Black Hills National Forest, managed by the U.S. Forest Service, Custer State Park, managed by the South Dakota Department of Game, Fish and Parks, and one small parcel of Bureau of Land Management land.

The U.S. Forest Service uses several tools for the control of prairie dogs: prescribed fire, live-trapping/relocation, and rodenticides. The U.S. Forest Service takes aggressive management actions to achieve the objectives of their Land and Resource Management Plan (LRMP) and to minimize conflicts with adjacent landowners. It is their policy to defer to any state-produced prairie dog conservation plans for guidance in responding to unwanted prairie dog colonization onto adjacent non-federal lands.

Custer State Park is located immediately north of Wind Cave National Park and addresses prairie dog control issues within its boundaries. As stated in the 1995 Custer State Park Resource Management Plan, the park has set the goal of maintaining approximately 500 acres of prairie dogs, which is two percent of the park's total rangeland (South Dakota Department of Game, Fish, and Parks 1995). This translates to approximately three to five separate colonies, none of which would be allowed to exceed 200 acres (Brundige pers. comm. 2005). Since adoption of the Resource Management Plan, the park's prairie dog population has not fallen below 500 acres. Prairie dog colonies are rotated within the park and new burrows are created to encourage them to retreat from park boundaries. There are currently two colonies that the park staff is allowing to develop, unmanaged, with close monitoring of vegetation conditions. Lethal methods employed by the park include poisoning with zinc phosphide and some shooting when necessary by agency staff. Non-lethal controls used include digging post-holes and live trapping. Management actions are taken to restrict colonies from entering the Hay Flats area, just north of Wind Cave National Park, which is maintained for the bison round-up (Brundige pers. comm. 2005).

One colony is not counted toward the park threshold of 500 acres, the colony in the southwest corner of the park, which crosses the boundary into Wind Cave National Park. This colony has seldom been actively managed (only pushing back the edges of expansion), and this is the only colony which the state park has worked cooperatively with NPS staff in managing, which was done prior to 1997 (Brundige pers. comm. 2005).

Management Actions of Private Landowners

Parcels adjacent to the park are owned by numerous landowners many of which are involved in ranching activities (Muenchau pers. comm. 2005b). These ranchers at times have to reduce their livestock herd size to match the amount of available forage, or supplement forage with feed. The amount of forage is dependent upon several factors, including the weather, incidence of wildfires, and competition with other grazers (such as prairie dogs). Another concern of ranchers is the risk of injury to livestock from stepping in prairie dog burrows. For these reasons, many private landowners choose to lethally control prairie dogs on their land.

Both the South Dakota Department of Game, Fish and Parks and the South Dakota Department of Agriculture provide onsite assistance to private landowners to lethally control prairie dogs on an annual basis, and free of charge. Zinc phosphide is used to poison the prairie dogs, and to apply this chemical more than once annually would be a violation of label restrictions. Landowners whose property is adjacent to the boundary of Wind Cave National Park qualify for these free services.

Boundary Expansion and the Change of a Land Use

The National Park Service is potentially expanding the boundary of Wind Cave National Park by purchasing approximately 5,675 acres in four tracts of land (representing three landowners, both public and private). This potential acquisition was approved by Congress, but no funds have been appropriated for the purchase. This land shares a nine-mile boundary with the south side of the park and is currently grazed by a commercial bison herd (NPS 2002). The land may contain one prairie dog colony, which has been poisoned (Farrell pers. comm. 2005a, Stoll pers. comm. 2005). If the land were acquired by the National Park Service, it would no longer be used for grazing of commercial stock and instead be preserved for its value to the ecosystem, representing a change in land use and management. One tract of 40 acres is currently not used for grazing of commercial stock (Stoll pers. comm. 2005).

Potential for Conflict

The management activities included in the action alternatives would not produce effects contrary to the goals of these public and private land policies. Most prairie dog population growth within the park would be directed and managed so that colonies would not easily transcend the park borders. Even a small amount of transfer would still be within the parameters of the public agencies' sustainable population management activities. Though Alternative B (up to 5,000 acres of prairie dogs) would provide for a greater likelihood of prairie dog movement between public and private land (due to the increased population), the Active Management Zone associated with Alternative B and the case-by-case control actions that could be implemented under Alternatives C and D would aid in eliminating and minimizing any potential conflicts with land use plans and population control policies of public or private entities.

Population Ranges

Under section 4.4.1 of NPS *Management Policies 2001* (NPS 2000a), the National Park Service is charged with “preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur.” Additionally, section 4.4.1.1. explains that while dramatic fluctuations of local wildlife populations can be the result of natural causes, it can also result from human-caused extirpation. When this happens, the National Park Service relies on local populations of the species outside the park to successfully recolonize on suitable habitat. However, if this is unsuccessful, the population of that species in the park may not recover from a significant drop in population. In cases such as this, in order for the National Park Service to achieve the goal of providing for the persistence of a species in the park, the park must take steps to maintain a sustainable population. The black-tailed prairie dog population within Wind Cave National Park is plague-free, as is the population in the adjacent Custer State Park and Forest Service managed lands. Plague has recently been confirmed in South Dakota.

In the event of a natural or human-caused incident that could threaten the future viability of the population, management actions would be necessary so that equivalent, plague-free colonies could recolonize the park, but the success of this action could not be assured. Alternative C — The Preferred Alternative successfully considers both the resource protection goals within the park and the local economy that is dependent upon adjacent land uses. The proposed colony acreage range (1,000 to 3,000 acres) promotes a prairie dog population that would be sustainable in the face of a severe potential extirpation event, while incorporating management actions that would contain the prairie dogs’ geographic expansion, which accommodates adjacent land uses to the extent possible. Decreasing the proposed population range (as in Alternative D, with 300-1,000 acres) could potentially lead to an unstable population within the park if locally-derived recolonization attempts were unsuccessful. While this would further the goals of private landowners near the park, this would also risk loss of the park’s prairie dog population, an important resource. Considering section 4.4.1.1. of NPS *Management Policies 2001* (see above), and the chance of a failed recolonization attempt, the population range in Alternative C would present the fewest conflicts with land uses, controls, and policies.

CONSULTATION AND COORDINATION

Several Native American tribes have demonstrated interest in the areas within Wind Cave National Park. The following tribes were contacted by letter on January 13, 2005, regarding this project. A copy of the letter sent to the tribal representatives can be found in Appendix A.

Arapaho Business Committee	Ponca Tribe of Nebraska
Cheyenne River Sioux Tribe	Ponca Tribe of Oklahoma
Cheyenne-Arapaho Tribes of Oklahoma	Rosebud Sioux Tribal Council
Crow Creek Sioux Tribal Council	Santee Sioux Tribal Council
Flandreau Santee Sioux Executive Committee	Sisseton-Wahpeton Sioux Tribal Council
Fort Belknap Community Council	Standing Rock Sioux Tribal Council
Fort Peck Tribal Executive Board	Three Affiliated Tribes Business Council
Lower Brule Sioux Tribal Council	Yankton Sioux Tribal Business and Claims Committee
Northern Cheyenne Tribal Council	

The U.S. Fish and Wildlife Service was contacted regarding this project on January 13, 2005. The Service responded with a list of species and a request to analyze opportunities for future black-footed ferret reintroductions on March 21, 2005. Copies of correspondence with the U.S. Fish and Wildlife Service can be found in Appendix A.

During development of this environmental assessment, the park contacted the South Dakota State Historic Preservation Officer (SHPO) regarding this project on January 13, 2005. A copy of the letter sent to the SHPO can be found in Appendix A.

Wind Cave National Park held two public scoping meetings in Rapid City (February 1, 2005) and Custer (February 2, 2005), South Dakota. Each meeting was held from 6:30 to 9:00 p.m. Attendees were asked to stay for the duration of the meeting as the meeting format was an interactive workshop process.

The park sent out two press statements prior to the meetings describing when and where each scoping meeting would be held and the format of the workshop-style meetings. The press statements were also posted on the park's website. Invitations with the same information were also sent to individuals and organizations on the park's mailing list, local tribes, the State Historic Preservation Officer, and the U.S. Fish and Wildlife Service.

The objectives of the meetings were: to identify the public's issues and concerns about prairie dog management at Wind Cave National Park and to hear the public's opinions about the different prairie dog management tools available to the park.

The public was also invited to comment on the project with written comment forms and on the park's website. No new issues were identified by the public as a result of the request for public input.

Planning Team Participants

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Tom Farrell	Chief of Interpretation	Wind Cave National Park
Dan Foster	Chief of Resource Management	Wind Cave National Park
Dan Roddy	Resource Management Specialist	Wind Cave National Park
Barbara Muenchau	Biological Science Technician	Wind Cave National Park
Marie Curtin	Biological Science Technician	Wind Cave National Park

Preparers

Don Kellett	Wildlife Biologist	Parsons
Nicole White-Scott	Environmental Scientist	Parsons
Janice Biletnikoff	Environmental Planner	Parsons
Michelle Johnson	Environmental Scientist	Parsons
Lee Monnens	Geologist/Soil Scientist	Parsons
Diane Rhodes	Cultural Resources Specialist	Parsons
Bruce Snyder	Technical Director	Parsons

List of Recipients

Federal Agencies and Government

- Advisory Council on Historic Preservation
- Dept. of Agriculture
 - U.S. Forest Service
 - Natural Resources Conservation Service
- Dept. of the Interior
 - Bureau of Indian Affairs
 - Bureau of Land Management
- National Park Service
 - Badlands National Park
 - Jewel Cave National Monument

Mt. Rushmore National Memorial
Minute Man Missile National Historic Site
U.S. Fish and Wildlife Service
U.S. Congressional Representatives from South Dakota
Tribal Historic Preservation Officer(s)

State and Local Agencies and Governments

Custer County Commissioners
Fall River County Commissioners
South Dakota State Historic Preservation Officer
South Dakota Game, Fish and Parks
Custer State Park

Native American Tribes

Arapaho Business Committee	Ponca Tribe of Nebraska
Cheyenne River Sioux Tribe	Ponca Tribe of Oklahoma
Cheyenne-Arapaho Tribes of Oklahoma	Rosebud Sioux Tribal Council
Crow Creek Sioux Tribal Council	Santee Sioux Tribal Council
Flandreau Santee Sioux Executive Committee	Sisseton-Wahpeton Sioux Tribal Council
Fort Belknap Community Council	Standing Rock Sioux Tribal Council
Fort Peck Tribal Executive Board	Three Affiliated Tribes Business Council
Northern Cheyenne Tribal Council	Lower Brule Sioux Tribal Council
Yankton Sioux Tribal Business and Claims Committee	

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GLOSSARY

Animal unit month (AUM): The amount of forage required by one animal unit (AU) for one month. One animal unit is defined as a 1,000 lb. (450 kg) beef cow with or without a nursing calf with a daily requirement of 26 lb. (11.8 kg) of dry matter forage.

Commensal: Referring to the relationship between two kinds of organisms in which one obtains food or other benefits from the other without damaging or benefiting it.

Efficacy: Effectiveness.

Epizootic: An epidemic outbreak of disease in an animal population, often with the implication that it may extend to humans.

Extirpate: To remove from an area completely. Different from extinction in that the entire species is not eradicated, just a discrete population.

Keystone species (Paine, R. T. 1969. A note on trophic complexity and community stability. *American Naturalist*, 103:91-93.): A keystone species is one whose impact on its community or ecosystem is disproportionately large relative to its abundance.

Long-term viable population: A population that will exist without undue risk of extirpation; also see minimum viable population and sustainable population.

Minimum viable population (Shaffer, M. L. 1981. Minimum population sizes for species conservation. *BioScience* 31: 131-134.): the smallest size required for a population or species to have a predetermined probability of persistence for a given length of time. For example; the minimum viable population is the smallest isolated population having a (90 percent or 95 percent) chance of surviving for (100, 500, or 1000) years despite the foreseeable effects of demographic, environmental and genetic stochasticity, as well as natural catastrophes.

Phenology: study of the timing of recurring biological events, the causes of their timing with regard to biotic and abiotic forces, and the interrelation among phases of the same or different species.

Seral: The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession.

Species richness: the number of species in a given area.

Stochastic event: random environmental, demographic, or genetic occurrences that may cause a drastic change in the population of a species; for example, extreme weather events, sylvatic plague outbreak.

Sustainable population: A population that will exist without undue risk of extirpation; also see minimum viable population and long-term viable population.

Symbiotic: the living together of differently named organisms". This definition includes mutualistic as well as parasitic relationships. A mutualism is a relationship in which both partners benefit by their association. Parasitism affords benefits to only one partner, with the other partner being either unaffected or detrimentally affected by the association. When using the term symbiosis a mutualism is usually implied

Ungulates: hoofed mammals

Viable: capable of living successfully; able to develop normally.